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Electric Railway Journal

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the State matters of any particular State. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or State to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or State affairs appear direct under the names of the city or State involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the more common keywords used in the index. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven tower wagons he would obviously look in the list under the general subject "vehicles," and of the two keywords that appear under this caption, only "Service and tower wagons" could apply to the article in question. The reader would therefore refer to this keyword under "S" in the body of the index. Articles not covered by key word appear alphabetically.

In addition to the groups of articles covered by these headings the papers and reports from railway associations and technical societies are grouped under the names of the various organizations. Proceedings of other associations are indexed only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper keyword.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legislation
Legal
Public service and regulative commissions
Public service corporations
Safety-first movement

CARS

Car design
Cars (descriptive)
Cleaning and washing of cars
Gasoline cars
Lubrication
Heating of cars
Lighting of cars
Storage battery cars
Ventilation of cars
Work and wrecking cars

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Bearings
Brakes
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Couplers
Current-collecting devices
Doors, seats and windows
Fenders and wheel guards
Gears and pinions
Headlights
Motors
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Insurance
Strikes and arbitrations
Wages

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Financial
Franchises
Maps
Operating records and costs
Statistics
Traffic investigations

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Interurban railways (general)
Locomotives
Low-voltage d.c. railways
Single-phase railways

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Inspection of cars
Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
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Welding, special methods

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Operating records and costs
Passenger handling records
Schedules and time tables
Signals
Stopping of cars
Train operating practice

POWER

Boilers and equipment
Cables
Energy consumption
Feeders
Overhead contact system
Poles
Power distribution
Power generation
Power stations and equipment
Purchased power
Substations and equipment
Third-rail contact system
Transmission lines
Turbo-generators and equipment

RECORDS

Maintenance records and costs
Operating records and costs
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Record forms

STRUCTURES

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TRACK

Pavement
Rail joints and bonds
Rails
Special work
Ties
Track construction
Track maintenance

TRAFFIC

Freight and express
Public, Relations with
Publicity
Routing of cars
Traffic investigations
Traffic stimulation

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Motor buses
Service and tower wagons

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Municipal ownership
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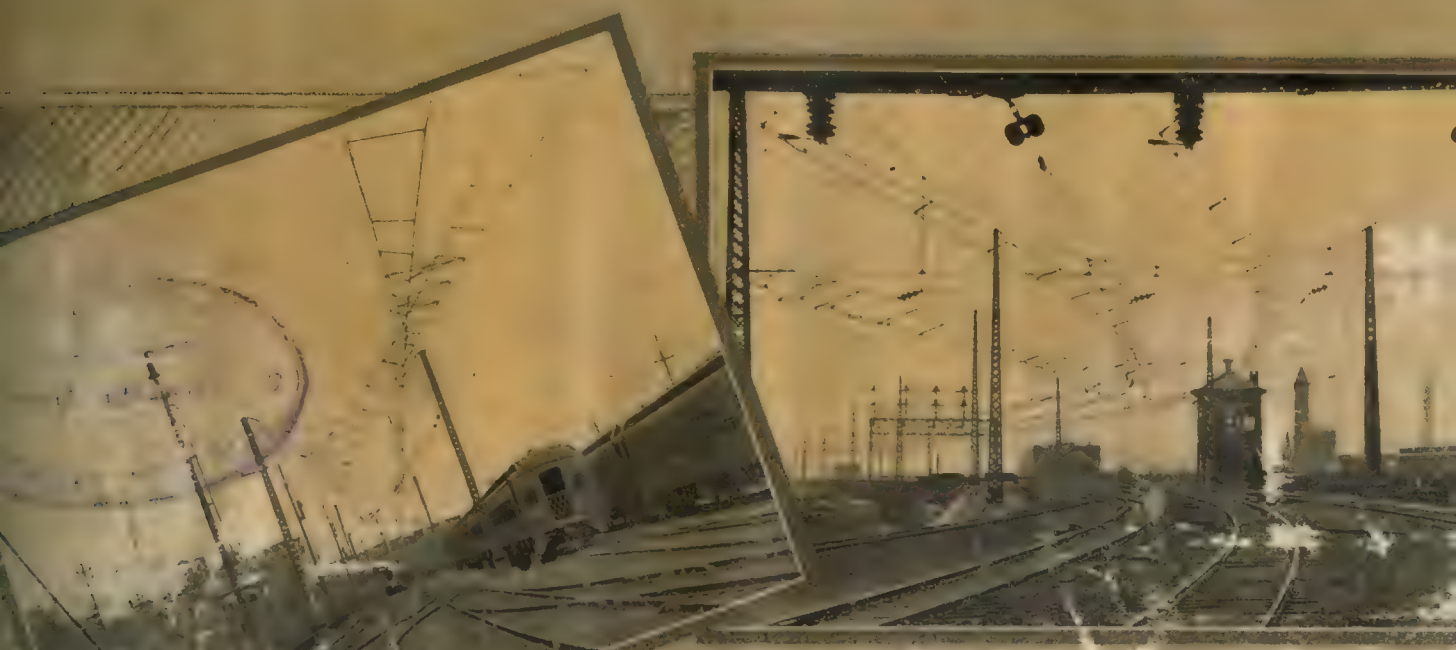
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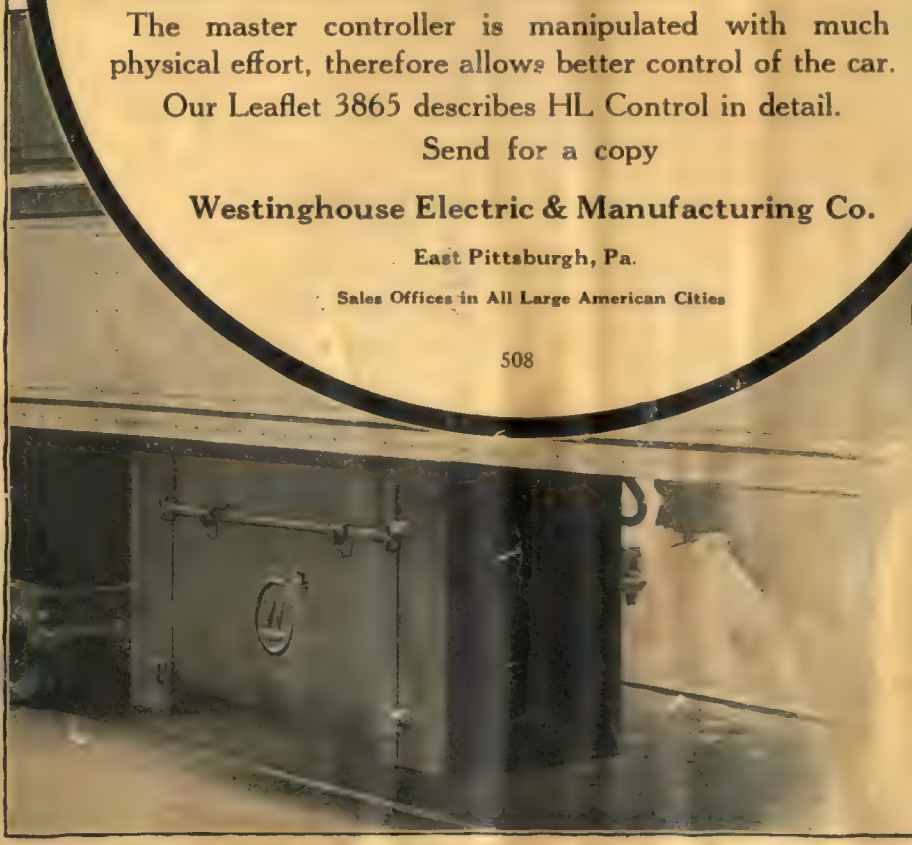
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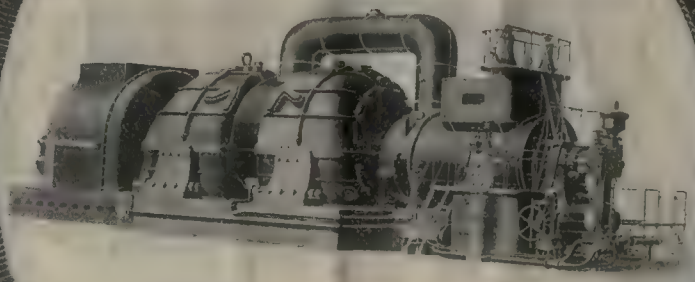
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A Glimpse Into the Future

Westinghouse
Steam Turbines of
45,000 and 70,000 KW.
are now under Construction.



Who dare predict the possibilities of the future?

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

W
WESTINGHOUSE ELECTRIC

Westinghouse

Westinghouse

Porcelain Insulators



The Future Ratings of Westinghouse Insulators

will be based on tests under conditions resembling those of actual service as closely as can be obtained in a laboratory.

The illustrations were obtained from photographs taken while the insulators were being tested, cemented to a metal pin mounted on a steel cross arm grounded, having the line wire tied to the insulator as in service.

We have transformers for insulator testing capable of developing any required test voltage, including 500,000 volts to ground.

Insulators tested and rated as above give better insurance to the buyer than when rated by the routine commercial test, where much higher flashovers can be obtained.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities

519

W
WESTINGHOUSE ELECTRIC

Sole Agent in the United States of the Pittsburgh High-Voltage Insulator Co.





The Westinghouse Inspector-Specialist is a practical railroad man, direct from the car-barn ranks. He knows the air-brake game from A to Z. Moreover, he knows how to impart his knowledge to others, whether it be to the barn-man to procure the best possible conditions of air brake equipment, or to the motorman to guarantee safety and to improve transportation movement.



"It is largely because of the **Westinghouse Inspector-Specialist's** close co-operation with our men that we are able to handle our cars better than ever before. His work with our barn-men is equally efficient. The majority of our compressors have never been down since first installed eight years ago, and at present rate of going will hang for eight years more." (Recent remark of a Street Railway Manager.)

Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

PITTSBURGH:
Westinghouse Building

CHICAGO:
Railway Exchange Building



NEW YORK:
City Investing Building

ST. LOUIS:
Boatmen's Bank Building

To You who are not a Subscriber

Look through the pages of this issue and see what a feast of useful, inspiring information has been prepared for the readers of the Electric Railway Journal.

Then resolve that hereafter you will be a subscriber so that you will not miss a single issue of the Electric Railway Journal throughout 1917 and thereafter.

To You who are not an Advertiser

Look through the pages of this issue. Note the splendid articles from the men who have done and are doing big work for better public relations. Note also the carefully compiled, exclusive statistics which the Electric Railway Journal has published on conditions in the industry during 1916.

Then resolve that during 1917 and thereafter you will be an advertiser in the one paper which is indispensable to your customers.

Electric Railway Journal

Member Audit Bureau of Circulations



O-B Type E Frog—Patented

Cutting the Cost of Line Work

It's cold work on top of the tower wagon this time of year. The linemen are all bundled up—heavy mittens and unwieldy coats.

Why let time be wasted—expensive time—fussing around with small bolts, nuts, washers, screws? O-B Cam Tip Devices do away with this useless expenditure of energy.

For instance, in the O-B Type E Frog, O-B Cam Tips form the approach. They are just slipped under the hooks, then turned over and down. They force the wire firmly into the groove and when the lips are clinched around the wire there is a smooth passage for the trolley wheel. O-B Cam Tips are readily renewable.

A single wedge secured by two large bolts holds the wire solidly.

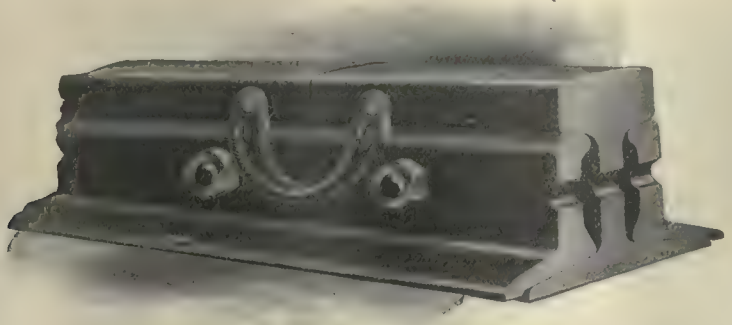
But ease of installation is only one point of superiority. There are the extra long legs, to protect the wire, the groove in the pan to steady wheel, O-B Sherardizing on all iron parts.

Look up complete line of O-B Cam Tip Devices—frogs, cross-overs, section insulators, strain plates—in Catalog No. 16 or write and say you are interested.



O-B Cam Tip, installed, cross-sectioned to show cam action

The Ohio Brass Company
Mansfield, Ohio



O-B Type J Bond Installed—Patented

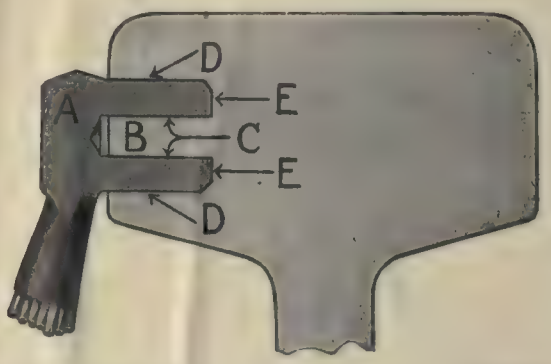
Economical, Efficient Bonding

Carefully and conservatively compiled figures show the O-B Type J to be an exceptionally inexpensive bond to install, considering labor, materials and depreciation on machine. This is due partly to its short length and partly to the perfection of the milling machine.

This machine is easily handled and speedy. A crew of three men can install from 100 to 150 bonds a day when they have ordinary traffic interruptions. Frequently an experienced crew installs considerably more than 150 a day.

Because of its large contact area (see cross-section), the O-B Type J Bond has excellent electrical efficiency. Its long life under vibration is due to its shape.

If you are interested in the O-B Type J Bond, we will be glad to tell you more about it.



This cross-section of the Type J Bond installed shows the large contact area. The bond is forced against the rail at C, D and E.

The Ohio Brass Company
Mansfield, Ohio



International Steel Crossing Foundation at crossing of Cleveland Railway and Wheeling & Lake Erie R. R. Installed 1915.

INTERNATIONAL
STEEL CROSSING FOUNDATIONS
Soon Pay for Themselves by Reducing Maintenance Costs

Picture in your mind's eye a resilient unit steel crossing foundation in which all your crossing joints are bridged and in which every square inch comes into effective bearing. That's the International Steel Crossing Foundation. No portion can get out of surface without being resisted by the entire foundation. The wheel loads cannot be concentrated over a point that is free to sag—it is evenly distributed over the unit. Rails and bolts do not work loose. Patented clips hold against all vibration and strains.

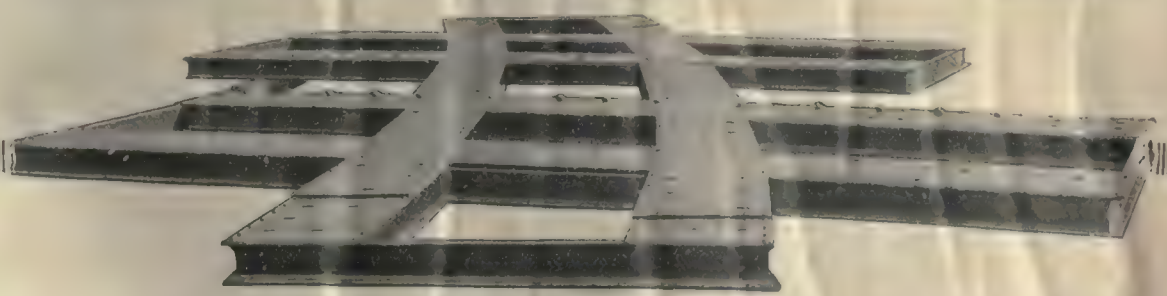
Think what the spring thaws and a soft, "boggy" roadbed do to your wood-tie crossings. Then remember the characteristics of an International Foundation. Now you can see why the latter soon pays for itself by reducing maintenance—and at the same time it doubles or triples the life of the crossing frogs.

Let us submit comparative estimates for your job.

The International Steel Tie Company
General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES

Western Eng'g Sales Co., Los Angeles, Cal. | San Francisco, Cal., Seattle, Wash. | R. J. Cooper Co., Salt Lake City, Utah | J. E. Lewis & Co., Dallas, Texas. | Maurice Joy, Philadelphia. | William H. Ziegler, Minneapolis, Minn



GOLDEN GLOW AT ST. LOUIS

The Company, the Men and the People all Marvel at its Wonderful Efficiency.

The United Railways Company of St. Louis are firm believers in "Golden Glow" Headlights. They have been using them on some of their cars for a year or so and are now installing more of them on both their city and suburban cars.

Their cars now operate through the streets of St. Louis headed by beautiful beams of soft, non-blinding "Golden Glow" light.

They run cars out into the suburban districts equipped with these same lights; their soft but powerful, penetrating beams piercing any ordinary atmospheric condition, whether foggy, dusty or smoky, better than any other known light.

The Company, the Men and the People have adopted this light because of its efficiency and economy.

All St. Louis is wide awake to its advantages.



ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

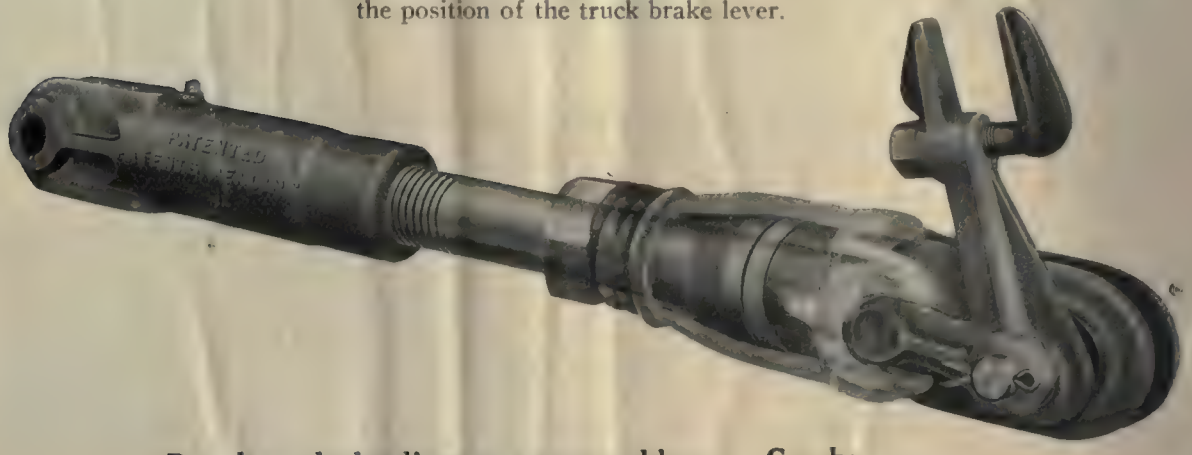
Anderson Slack Adjusters Make All Cars Brake Alike

Every electric railway car leaving a barn is in danger, until the motorman learns how his brakes are set, unless the car is equipped with automatic truck brake adjusters. Every time you change crews on the street your car is in danger of collision, until the new man learns his stopping distance.

You can eliminate this condition on any car by a few minutes' work in installing Anderson slack adjusters, which make every car handle and brake alike. Moreover these adjusters at the same time decrease brake shoe wear, reduce pull-ins for brake setting until new shoes are needed and lessen power consumption.

The Anderson brake adjuster is really an automatic turnbuckle and can be installed without change in present brake rigging. Heat, cold, snow, mud or dirt cannot affect its operation. By its gradual action it compensates for any slack, no matter how small, but makes allowance for trucks greatly affected by load. This prevents locked wheels when the load leaves the car.

Proper brake adjustment must take place on the truck itself. The Anderson adjuster does not attempt to regulate piston travel because this causes uneven braking and brake shoe wear by constantly varying the position of the truck brake lever.



Put these slack adjusters on your old cars. Can be applied to almost any double or single truck car. Send for information and data sheet.

Holden & White

General Sales Agents for The Anderson Brake Adjuster Co.

1508 Fisher Building, Chicago

U. S. Metal & Manufacturing Company, New York and Washington; Grayson Railway Supply Company, St. Louis; C. E. A. Carr Company, Toronto; C. F. Saenger & Company, Cleveland; W. M. McClintock, St. Paul.

Now is a splendid time to prove to yourself the efficiency of the SAMSON



SAMSON

Splicers stand up under the most difficult service conditions everywhere

Sleet, cold, heavy traffic and consequent heavy current consumption make overhead maintenance doubly difficult. But by using SAMSON SPLICERS you eliminate one source of trouble and expense. The universal reputation of SAMSONS for non-arcing, not forming hard spots, staying upright, and having strength and life in excess of new wire, has been earned repeatedly. It will pay you to investigate.

DREW OVERHEAD LINE MATERIAL REDUCES MAINTENANCE COSTS

All Drew material is standardized. The designs have been evolved by close contact and co-operation with practical operating engineers. The workmanship is careful and conscientious. The raw materials are bought under rigid specifications. Therefore, it will pay you to specify *DREW*. It will pay you in labor saved, in longer life in service and most satisfactory operation.

The Drew Service Department is at your disposal in solving overhead line problems. Data on any article of Drew manufacture gladly furnished on request.

DREW ELECTRIC & MFG. COMPANY

Offices and Works: 1016 E. Michigan Street, Indianapolis, Ind.

District Representatives

HOLDEN & WHITE,
1508 Fisher Building,
Chicago, Ill.

FRANK F. BODLER,
903 Monadnock Building,
San Francisco, Cal.

JAMES C. BARR,
84 State Street,
Boston, Mass.

A. P. KELLY,
661 Calvert Building,
Baltimore, Md.

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SUPPLY CO.,
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RAILROAD SIGNAL
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New York, N. Y.

DREW
MEANS "SERVICE EFFICIENCY"

Victor INSULATORS


No. 5155
27000 V


No. 5166
35000 V


No. 5226
45000 V

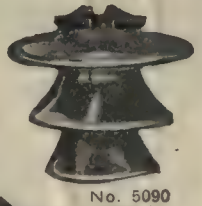

No. 5539
35000 V


No. 5233
40000 V

—the New Designs


No. 5005
45000 V


No. 5353
50000 V


No. 5090
60000 V


No. 5106
70000 V


No. 5240
80000 V

These designs have met with instant approval because they embody long sought electrical and mechanical strength.

Already they have received the endorsement of engineers who select insulators for lines where continuous uninterrupted service is a most vital factor.

Unqualifiedly the most efficient, rugged, dependable designs ever offered.

Get the Supplement to "The Insulator Book" describing these designs

THE LOCKE INSULATOR MFG. CO., Victor, N. Y.

New York City Office, 50 Church Street

SALES OFFICES:

Pierson, Roeding & Co., San Francisco, Seattle and Los Angeles
Electric Service Supplies Co., Chicago and Philadelphia
Pettingell-Andrews Co., Boston
Union Electric Co., Pittsburgh
Inter-Mountain Electric Co., Salt Lake City
Wm. Geipel & Co., London, England
The O. H. Davidson Equipment Co., Denver



Dossert Connectors

Contribute to the Efficiency of the Salt Lake & Utah Railroad

Where they are used for joining the substation transformers to the high-tension bus bars. The transformers are connected "delta-delta," and the Dossert Connectors enable the quick disconnecting of a defective transformer to permit operation on "open delta."

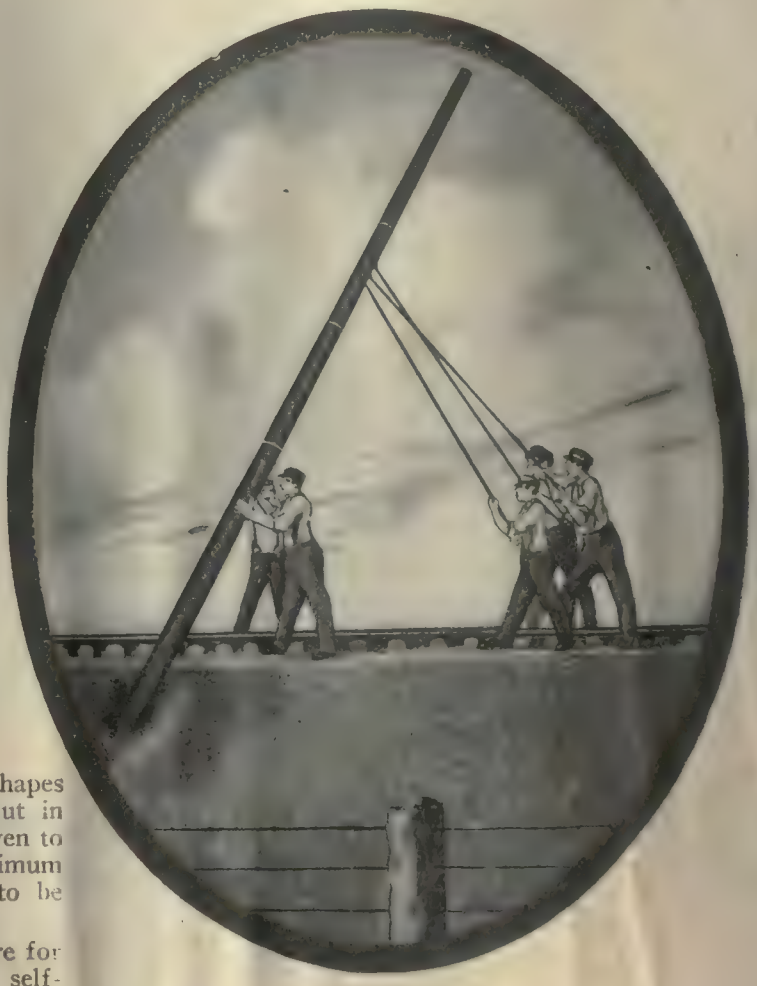
Many other progressive railways all over the country are using Dossert Connectors throughout their power plants and substations, for bus bar work, for junction boxes in cars, in sectionalizing cases of signal control systems, etc. Our Catalogue will show you what Dossert efficiency is, and what it will do for you—write for your copy now.

DOSSERT & COMPANY

H. B. LOGAN, President

242 West 41st Street, New York

The ELRECO Tubular Pole is the Strongest Practicable Pole



One of the most efficient structural shapes known to engineers is the I-beam. But in utilizing an I-beam due care must be given to its installation with respect to the maximum strength of the section and the load to be carried.

The impracticability of such a structure for withstanding strains in *all* directions is self-evident.

The only shape that combines the highest limit of efficiency in unit weight for all-around strength is the circular tube.

As the circle is the symbol of perfection in geometry, so is the tube the symbol of perfection in poles.

For solid proof consider this case. A 30 ft. Elreco Tubular Pole made up of 6 in., 5 in. and 4 in. sections will weigh about 50 lb. lighter and cost about $1.00 less than any other form of metal pole of the same all-around strength.

Elreco Tubular Poles are not in use by hundreds of thousands because they were the only ones available in the past, but because they *were* and *are* the best.

Elreco Tubular Poles have made good *at all times* as the best poles, against every other form, style and shape of pole conceivable.

In the City of Chicago more than 50,000 Elreco Poles are in service. Other Cities throughout the World have their proportionate share.



ELRECO Tubular Poles Combine

Lowest Cost
Lightest Weight
Least Maintenance
Greatest Adaptability

ELECTRIC RAILWAY EQUIPMENT CO.

Cincinnati, Ohio
New York: 30 Church Street



Automatic Track Switch in Rochester

BY C. L. CADLE
Electrical Engineer New York State Railways, Rochester Lines

In November, 1915, the Rochester lines of the New York State Railways installed at one of the busiest points on its city lines a new type of track switch which is saving its first cost at the rate of about once in every three months, and which has given very satisfactory results from an operating standpoint ever since it was placed in service.

. . . . . .

The principal features of the switch that differ from those of the old type generally in operation throughout the country are, first, that it is driven by a motor, thus permitting the introduction of a train of gears to retard the motion of the switch point when it moves from one side of the bed to the other. This causes the switch to operate without splashing. In addition to this the switch point is firmly held in the position to which it is thrown by means of a spring that is connected with a train of gears, and in consequence, the switch point cannot fly back between the trucks of a car and thus make it split the switch. The third important feature is a control that is effected by both a cut-in contact and a cut-out contact so arranged that a following car which is extremely close to the car operating the switch is prevented from throwing the switch point between the trucks of the first car as it passes over the switch point. In the accompanying illustration the cut-in contact is shown just ahead of the trolley pole of the car in the foreground. The cut-out contact does not appear in the picture, being attached to the trolley wire near the frog, approximately over the switch.

United States Electric Signal Co.
West Newton, Massachusetts
Western: Frank F. Bodler
Monadnock Bldg., San Francisco
Chicago: Warren Moore Osborn
McCormick Bldg.
Foreign:
Forest City Electric Service Supply Co.
Salford, Eng.

U.S. ELECTRIC SIGNAL CO. WEST NEWTON, MASS.

In Rochester It's a 300% Investment

Rochester, N .Y., is a busy town —traffic at the corner of Main and State Streets requires 150 switch-movements an hour—and making those switch-movements is a

"Collins" Non-Splitting Electric-Track Switch

It does not allow the remotest chance of the switchpoint being thrown between the trucks of a car by a following movement under the contactor.

It does **not** splash the foot-traffic with mud or water—

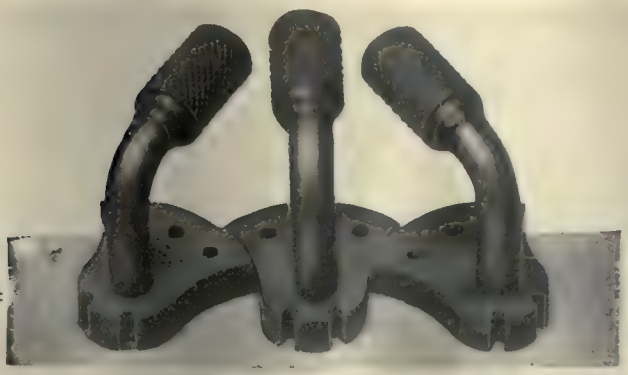
It is **not** subject to derangement by dampness—

It **cannot** be damaged by a car standing under the contactor—

But it **does** handle the traffic—accurately, surely, safely—

It **does** pay for itself every three months—

And what **more** can you ask of a switch?



East Bound Car



West Bound Car



The INTERLOCK that makes LAP ORDERS Impossible



with the

SIMMEN SYSTEM

of Continuous Cab Signals

The device shown above is another example of the simplicity of the Simmen System. By means of this simple mechanical arrangement lap orders are positively prevented. The dispatcher cannot make a mistake.

Each lever controls a signal point and has three definite positions. The upright position indicates that a "meet" is scheduled for that siding, and therefore gives a red signal to trains approaching from both directions.

The levers leaning to the right give the green signal to east bound trains only. The levers leaning to the left give the green signal to west bound trains only.

These control levers are arranged in the same consecutive order that the signal points which they control are arranged on the railroad. It will be obvious that the simple segment which moves with each control lever prevents setting any given lever in the east bound clear position, when the lever controlling the adjacent siding is in the west bound clear position. Thus lap orders are prevented.

The Simmen System enables the dispatcher —miles away—to give a positive continuous signal *in the cab* of the train and the train itself gives the dispatcher a return signal *automatically*. The method is so simple that many railroad men can scarcely believe it possible, until they have been convinced by a personal investigation.

Why not decide today to investigate the Simmen System thoroughly? You will be interested and enlightened and may profit by the experience.

Simmen Automatic Railway Signal Co.

1575 Niagara Street, Buffalo, N. Y.

PACIFIC COAST REPRESENTATIVE—W. H. Crawford, 609 Spalding Bldg., Portland, Oregon



Chapman Automatic Signals

Handled Heavy Traffic Perfectly During the Eastern States Agricultural Exposition

at Springfield, Mass. The only single-track section on the Springfield Street Railway Company's line leading to the fair grounds is on the 2600-foot North End Bridge over the Connecticut River.

A Chapman Signal is in service at each end of the bridge, and these signals were most valuable in facilitating safe and rapid service. During the show, cars were operated in groups of five across the bridge, first in one direction, then in the other—and 60 cars an hour were easily handled in each direction.

The Springfield Street Railway finds Chapman Signals also extremely useful in controlling regular traffic movements over its suburban and interurban lines, including its through service to Holyoke and Westfield.

Chapman Signals are giving similar results wherever installed—they promote speed with safety—protect lives and schedules. Find out about them. Write today for detailed information.

Charles N. Wood Company, Boston, Mass.

UNION THREE ASPECT FLAGMAN

Style DW



The most important principle in railway signaling is that which requires a signal to indicate stop when there is a failure of any part of the apparatus to function properly, or when there is an interruption of the power supply. This principle cannot be embodied in a signal indicating stop solely by the continuous movement of a disk or arm, because when such movement ceases for any reason the stop indication will be lost.

This signal, while displaying stop indication by the movement of a disk in normal operation, is so designed that a failure of any part of the apparatus or the absence of power will cause a second or emergency stop indication, which is entirely different and distinct from the proceed indication. In other words, this signal has three aspects, one indicating proceed and either of the other two indicating stop.

For additional information see Bulletin 86.

The Union Switch & Signal Co.

Founded by Geo. Westinghouse 1881.

SWISSVALE, PA.

Trade Mark

Hudson Terminal Bldg. NEW YORK
Peoples Gas Bldg. CHICAGO
Canadian Express Bldg. MONTREAL
Candler Annex ATLANTA
Railway Exchange Bldg. ST. LOUIS MO.
Pacific Bldg. SAN FRANCISCO

Represented by the GENERAL ELECTRIC CO. in Australasia, South Africa and Argentina

Trade Mark



Your Protection Against
"Old Jack Frost"

Aristos "COPPERWELD" Copper Clad Steel Wire

can not be beaten to a "yield point" by winter weather. It will retain its perfection throughout the heaviest of snow and ice storms—and therefore reduces maintenance costs.

Aristos "Copperweld" costs less per pound than copper wire, is 7 per cent lighter (size for size), is 60 per cent stronger and gives better service. It also has 126 per cent greater elastic limit.

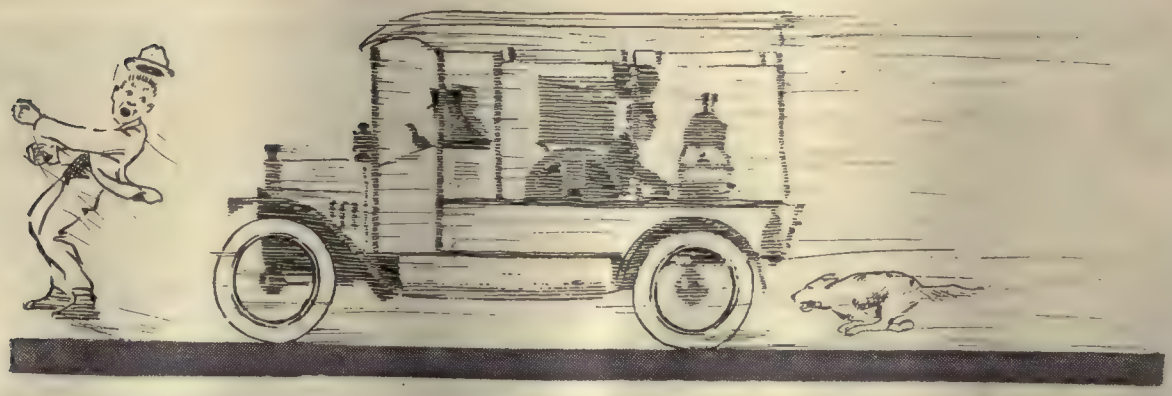
Are you interested? Then write!

Western Sales Office:
Steel Sales Corporation
Chicago, Illinois

Eastern Sales Office:
Page Woven Wire Fence Co.
30 Church St., New York

Made from the product of COPPER CLAD STEEL CO., Pittsburgh, Pa.
Drawn and Sold Exclusively by

PAGE WOVEN WIRE FENCE COMPANY
MONESSEN, PA.



The Whole Outfit Gets There—*FAST*

The complete outfit—tools, supplies and bonding gang, all get to the work at one time—and get there *fast.*

Time saved means money saved, and this saving is in *your* pocket if you use the

Champion Bonding Truck

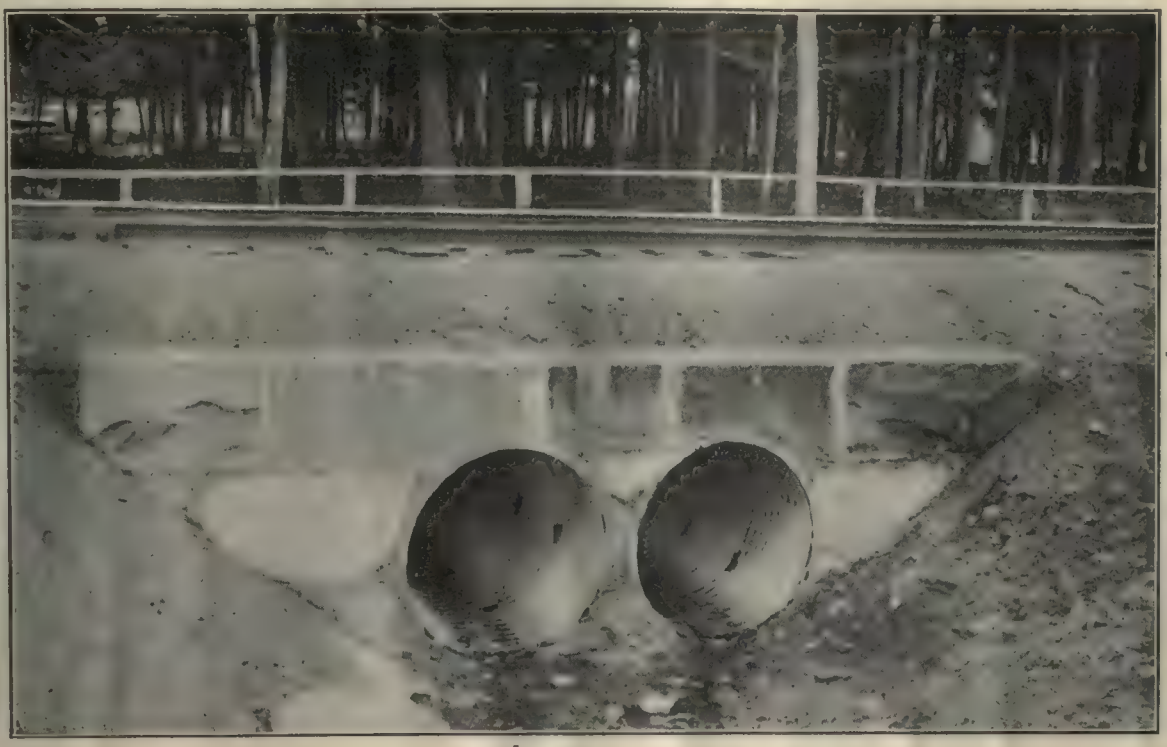


for Your Rail Bonding Job

No Interference with Schedules

The Electric Railway Improvement Co.

Cleveland, Ohio



"ARMCO" IRON CULVERTS

Give Long and Faithful Service

because of the **extreme purity** of the iron of which they are made. Large numbers of satisfied users, all over the country, confirm this statement. "Armco" Iron Culverts withstand severe conditions not only because of their resistance to corrosion, but also because their corrugated form and overlapping joints confer ample strength to carry heavy fills and the rolling loads of railway traffic. For use under extreme conditions, they are obtainable in gauges heavier than standard.

Write the nearest Manufacturer for information and prices on "Armco" (American Ingot) Iron Culverts, Siphons, Flumes, Sheets, Roofing and Formed Products.

AMERICAN ARMCO INGOT IRON

Resists Rust

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
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Iowa Pure Iron Culvert Co.
Iowa, Independence
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Montana, Missoula
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Nebraska, Lincoln
Lee-Arnett Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
Nevada, Reno
Nevada Metal Mfg. Co.
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Dixie Culvert & Metal Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
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South Dakota, Sioux Falls
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Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal Works.
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Cul. & Flume Co.
Virginia, Roanoke
Virginia Metal Culvert Co.
Washington, Spokane
Spokane Cor. Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.

These Bricks KNIT into a Vibration-proof and Water-excluding Track Paving



Wire-Cut Lug

It retains its smoothness and durability. Its sharp, square edges **assure** this.

Wire-Cut Lug Brick gives the greatest permanency of construction. It resists abrasion and breakage. Its uniform lugs and rough edges form a positive bond for the cement filler.

And remember that the wire-cut method is the most durable pavement for extremely heavy traffic.

Mr. Railway Man, it's up to you. Do you want a pavement that will go to pieces in a few months' time, or do you want the pavement that is put down to **stay** down?

Ask our paving engineers to help you. They'll be glad to.

Manufacturers Licensed by

Dunn Wire-Cut Lug Brick Co., Conneaut, Ohio

LICENSEES:

Corry Brick & Tile Company, Corry, Pa.
United Brick Company, Greensburg, Pa.
One plant at Conneaut, Ohio.
Sterling Brick Company, Olean, N. Y.
Reynoldsville Brick & Tile Co., Reynoldsville, Pa.
Danville Brick Company, Danville, Ill.
Clinton Paving Brick Company, Clinton, Ind.
Alton Brick Company, Alton, Ill.
Medal Paving Brick Co., Cleveland, Ohio.
One plant at Cleveland, Ohio.
One plant at Carrollton, Ohio.
One plant at Malvern, Ohio.
One plant at Wooster, Ohio.
Metropolitan Paving Brick Co., Canton, Ohio.
Four plants at Canton, Ohio.
One plant at Willow, Ohio.
Bessemer Limestone Co., Youngstown, Ohio.
Three plants at Bessemer, Pa.
Peebles Paving Brick Co., Portsmouth, Ohio.
Two plants at Portsmouth, Ohio.
One plant at Firebrick, Ky.
Murphysboro Paving Brick Co., Murphysboro, Ill.
Southern Clay Mfg. Co., Chattanooga, Tenn.
One plant at Robbins, Tenn.
One plant at Coaldale, Ala.
One plant at Birmingham, Ala.
McAvoy Vitrified Brick Co., Philadelphia, Pa.
One plant at Perkiomen Junction, Pa.
Windsor Brick Company, Akron, Ohio.
Hocking Valley Brick Co., Columbus, Ohio.
One plant at Logan, Ohio.
Veedersburg Paver Co., Veedersburg, Ind.
Springfield Paving Brick Co., Springfield, Ill.
Terre Haute Vitrified Brick Co., Terre Haute, Ind.
Albion Vitrified Brick Co., Albion, Ill.
Alliance Clay Products Co., Alliance, Ohio.
Westport Paving Brick Co., Baltimore, Md.
One plant at Westport, Md.
The Mack Mfg. Co., New Cumberland, W. Va.
Four plants at New Cumberland, W. Va.
The Hydraulic-Press Brick Co., St. Louis, Mo.
The Barr Clay Co., Streator, Ill.
Burton-Townsend Co., Zanesville, O. Two plants.
The Trimble Paving Brick Co., Dayton, Ohio.
One plant at Trimble, Ohio.
One plant at Glouster, Ohio.
The Thornton Fire Brick Co., Clarksburg, W. Va.
One plant at Thornton, W. Va.
Indiana Paving Brick & Block Co., Brazil, Ind.
Standard Brick Co., Crawfordsville, Ind.
Shawmut Paving Brick Works, Shawmut, Pa.
The Pennsylvania Clay Co., Pittsburgh, Pa.
One plant at Conway, Pa.
One plant at Crows Run, Pa.
One plant at Bradys Run, Pa.
Clydesdale Brick & Stone Co., Pittsburgh, Pa.
Plant at Elwood City, Pa.
John Kline Brick Co., Wickliffe, Ohio.
Streator Clay Mfg. Co., Streator, Ill.
Martinsville Brick Co., Martinsville, Ind.
Cleveland Brick & Clay Co., Cleveland, Ohio.
Jamestown Shale Paving Brick Co.,
Jamestown, N. Y.
Purington Paving Brick Co., Galesburg, Ill.
Four plants.



NATIONAL PNEUMATIC

Manual and Pneumatic Door and Step Control for the New Cars of Syracuse and Utica

Because of their traffic-accelerating features, ease of operation and general reliability—the National Pneumatic Company's door and step control was specified

For Thirty-Five Peter Witt Car Rider's Cars

In these cars, the two sliding doors at the center are independently operated from the conductor's stand by means of National Pneumatic engines, type GM 2⅝x6.

Manually-operated equipment is used at the front of the car, but provision has been made for pneumatic engine operation eventually should traffic demand it.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York

515 Laflin St. Chicago

Practical advice in the shop is trouble saved on the road

That is one of the many benefits secured through our free Expert Service. Read the following partial report from one of our Experts:

"The manager understands of course that if the bearings are in poor condition, even the best oil will not prevent trouble, but he is greatly perturbed by the hot boxes on their interurban cars. I have made *suggestions* to obviate this and bring about permanent betterments to the service, as follows:

"First—The work of rebabbitting journal brasses should be done at the main shop and by one man, so as to place the blame for poor work that is being done.

"Second—That a more liberal supply of new brasses be placed in service, as there are a number of the old ones that must be scrapped.

"Third—That as soon as possible rebabbitting of journal brasses be discontinued and the brass be allowed to wear to a scrapping point and then taken out of service.

"Fourth—On account of the high speed and weight of cars, there should be a more liberal renewal of high grade packing, as a large proportion of the journal packing now in service is short strands, and while it would prove satisfactory in slower service, it is not conducive to good operation under the present conditions.

"Also, I have *requested* them to discontinue a practice which, no doubt, has been the cause of a part of the journal trouble, and if continued it will ruin the journals. I refer to a block of wood that has been made in the form of a journal brass and when they have a hot journal they remove the brass and put in the block of wood with a sheet of emery cloth on its face and then run the car. The result is another hot journal, as it is impossible to remove all the emery from the journal without removing the journal box. Furthermore, any irregularity in the journal face or diameter will be aggravated by such a proceeding and new journal brasses will have so little surface in contact with the journal that the weight per square inch is out of all proportion to what it should be. This was proven by an inspection of journal brasses that had only been in service twenty-four hours. The journal box dust guards have not had the attention they deserve, and there are a number of journals without them."

Little things? Yes. But it was the viewpoint of a practical outside man that discovered them and realized their important effect on good service. That is what our Experts will do for you—point out the little faults, far reaching in their unfavorable effect on your service, that you have lived so close to that they have been unnoticed. And note that our man made only SUGGESTIONS and REQUESTS of the railway officials—no commands, no arbitrary demand that such and such a thing be done—it is up to the officials to accept or reject our recommendations. But the wide-awake railroad man is looking for practical advice. And we are equipped to give it to him.

Galena-Signal Oil Co.

Franklin, Pa.



The Drop Test for Davis Steel Wheels

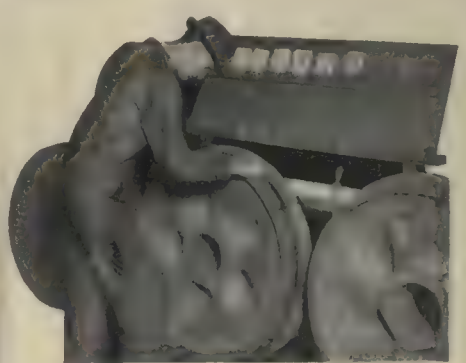
Here is a test that is mighty important to an electric railway man. It is made to insure full strength in every wheel that leaves our foundry. It is your guarantee that your passengers and equipment are not subjected to the hazard of broken wheels.

After the wheels have been tempered they are taken to a special machine for the drop test. Here, supported at three equidistant points on the underside of the flange, they sustain two blows from a 500-pound weight dropped from a height of 6½ feet and directed against the hub.

Probably no set of actual service conditions short of a collision or accident would call for such wheel strength. But Davis Steel Wheels are designed with an extra large factor of safety. That's why they are so well known for strength and safety, regardless of the fact that *they save 20% in weight.*

The "one-wear" feature makes Davis Steel Wheels the most economical for electric railway service. The hard, tough manganese steel tread gives full life service without grinding, wheel removals or truck changes.

Let us show you the economical possibilities of Davis Steel Wheels. A request will bring all the data.



Taping Davis Steel Wheels to insure proper mating in service

DAVIS Steel Wheels

The steel wheel with the one wear tread.

No turning—no trouble with motor clearances.

A hard, tough manganese tread and flange.

A soft, ductile steel plate and hub.

Reduction in weight.

20% saving in weight.

Minimum Maintenance Cost.

Strength — safety — economy.

The steel wheel backed by years of successful service.

You are not expected to adjust your conditions to meet our product. Davis Steel Wheels are made to meet A. E. R. A. Specifications and your service requirements.

Write.

American Steel Foundries

1100 McCORMICK BUILDING CHICAGO



Samson Spot Trolley Cord

is highly resistant to all actions of the weather because it is firmly braided and thoroughly waterproof. It saves repair, expense, time and trouble. No abrasion—no swelling in the catcher.

All Samson Spot Trolley Cord bears our trade mark—the Colored Spots.

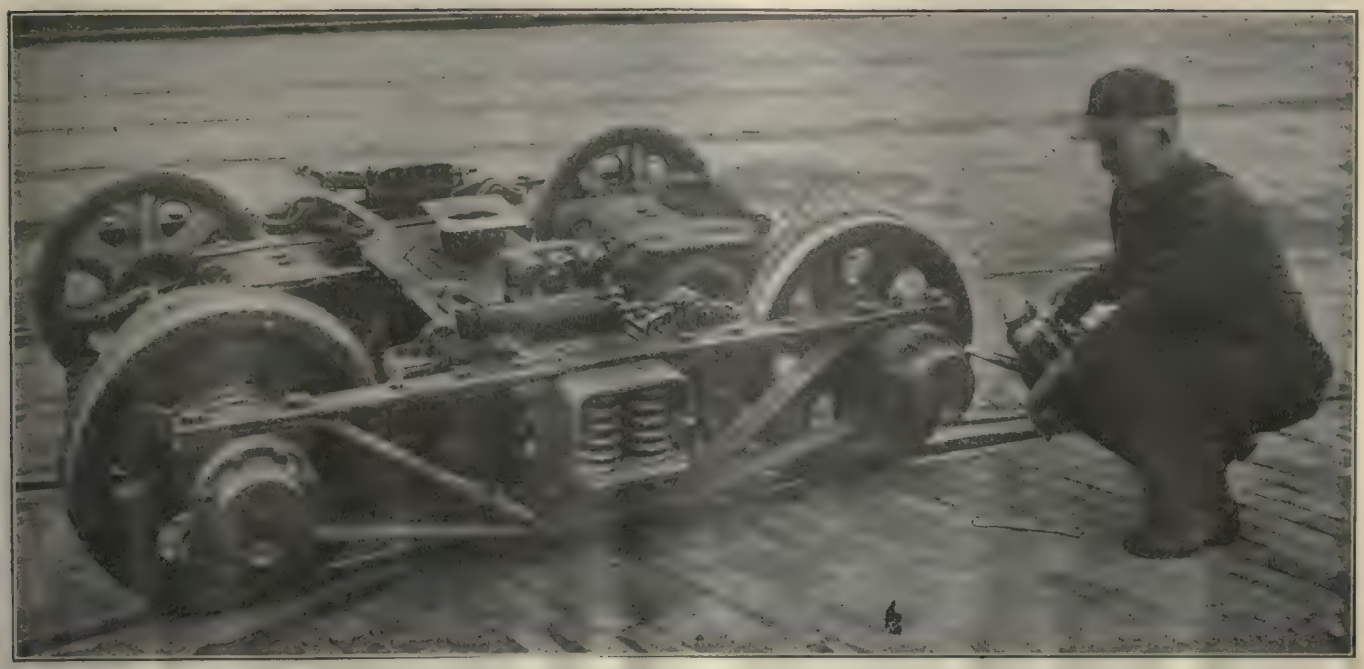
Samson Bell and Register Cord

is made of the same extra quality cotton yarn as used in Spot Cord. It wears better, looks better—and costs less than other materials.

Can be obtained in all sizes and colors, with wire center if so desired.

We are anxious to send you samples and prices. Write for them.

SAMSON CORDAGE WORKS
BOSTON, MASSACHUSETTS



Said the Shop Foreman:

"Nothing to it when it comes to lubricating

Hess-Bright Ball Bearings

"All we have to do is to loosen one nut and force in the grease; and the grease will go of itself to where it can do the most good.

"We Don't Have to Worry

"About having the packing char or glaze

"About dirt or sand getting into the journals

"About having the packing fall away from the bearing

"About having the cars delayed on account of hot journals

"And the time between lubrication is measured by months now instead of days."



TRADE MARK

HB DWF

HESS-BRIGHT

THE IN'MITABLE BEARING

Hess-Bright Ball Bearings spell Maximum Revenue Mileage

THE HESS-BRIGHT MANUFACTURING COMPANY

FRONT ST. & ERIE AVE., PHILADELPHIA, PA.

HESS-BRIGHT'S CONRAD PATENTS ARE THOROUGHLY ADJUDICATED



One of Thirty-Five Car Rider's Cars on which DURADUCT is used.

A Specification for Duraduct

Reg. U. S. Pat. Off.

For twenty-five Arch-Roof, Front-Entrance, Center-Exit, Pay-Enter Cars for Syracuse and for ten like cars for Utica as follows:

"All light wiring inside of car-body is to be installed in DURADUCT, and all light or signal wiring underneath car is to be installed in a proper size Duraduct."

Why not write Duraduct into your specifications? It's going on the best cars of the best railways!

Sample on Request

TUBULAR WOVEN FABRIC CO.

MANUFACTURERS

PAWTUCKET, R. I.

A. HALL BERRY, General Sales Agent

97 Warren Street, New York **9 South Clinton Street, Chicago**

Distributors for Canada: *Northern Electric Company* LIMITED



This All Steel Train of Differential Electric Dumping Cars belongs to the Cleveland Railway Co., Cleveland, Ohio. They save enough labor within one year to pay for themselves. They make more money than passenger cars.

THE DIFFERENTIAL ELECTRIC DUMPING CAR

is low and may be loaded while in tilted position. It is Electrically operated and discharges the contents far from the tracks. It is light and quick and pleases Everybody.

Trains of them are operated and unloaded in congested districts without interfering with passenger car schedules. Ask us NOW for detailed information about this big money-saver and promoter of better public relations.

Southern Office and Works : Nashville, Tenn.

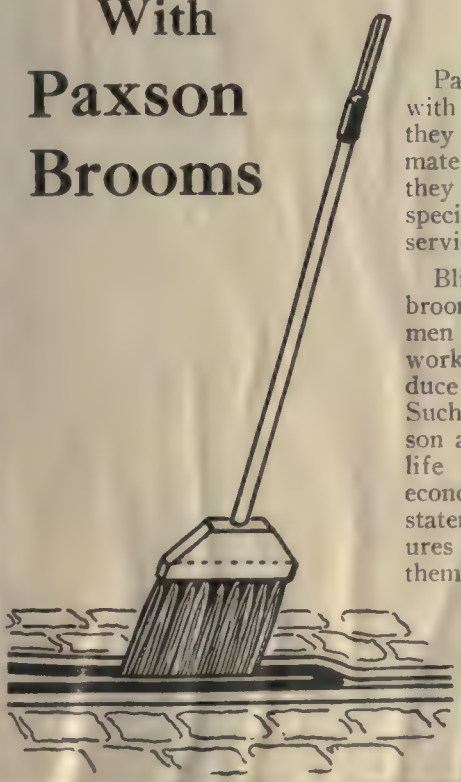
Differential Car Company

141 Broadway, New York



Sweep Up!

With Paxson Brooms



Paxson Brooms fairly bristle with goodness. Not only are they made of the best obtainable materials and made right, but they are designed to meet the special requirements of railway service.

Blind men can make ordinary brooms, but it takes wide-awake men with a clear vision of the work the broom has to do to produce efficient, durable brooms. Such men stand behind the Paxson and assure you of that long life and efficiency that spells economy. This is not a general statement. We have specific figures that prove it. Write for them.

J. W. Paxson Co.
1021 No. Delaware Ave.,
Philadelphia, Pa.

A crossing broom that will stand hard work. Of flat, tempered steel wire bristles.

A split bamboo broom for light work with snow or dirt in curves, frogs and switches.

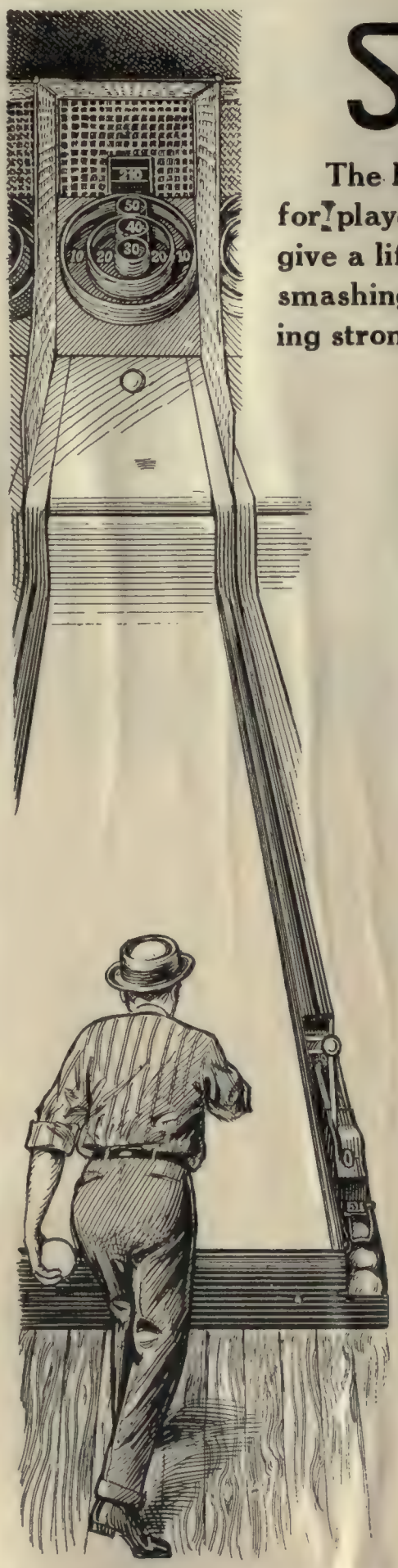
A fine wire broom built to handle all debris that may get into frogs, switches and curves.



Built for rapid work. Makes a clean sweep, and serviceable the entire year.

"Fan" bristles make a strong cleaning edge, and give durability to the broom.

A hard service broom made with flat tempered steel bristles.



SKEE BALL ALLEYS

The Bowling Game with a Punch that has a th ill for player and spectator alike. The leaping balls give a life to the game that no crowd can resist. A smashing big success for three years and daily growing stronger. Read the following:

Wildwood, N. J.,
November 13, 1916.

The J. D. Este Company,
Philadelphia, Pa.

Gentlemen:

At your request to hear from me as to my success with your game of Skee-Ball, would say:

Three years ago I purchased from you four Skee-Ball Alleys. At that time I had just acquired a property on the Boardwalk at Wildwood, New Jersey. My object in buying the Skee-Ball Alleys was to attract a crowd and thereby form a new amusement center; in this I have been amazingly successful, due entirely to Skee-Ball.

Not only has Skee-Ball increased the value of my property, but it has been very profitable to me to operate. The first year my four alleys earned an average of $52.15 (or $13.04 each) daily throughout the summer. The second year I purchased two more alleys and my earnings were increased. Last year was by far the most successful of the three. On the 3rd of last September my six alleys earned $262.00, an average of $43.66 per alley per day.

I attribute my success partly to the fact that I use the greatest care in keeping my alleys clean and in good condition. The balls are sandpapered, the carpet scrubbed, the woodwork rubbed down and the brasswork polished daily, so that after three years of the hardest kind of pounding they look practically as good as new.

With best wishes for your continued success and with kind personal regards, I am

Very sincerely yours,
(Signed) JOHN T. BYRNE.

This is just one experience out of hundreds, in towns and cities ranging in population from 500 to 5,000,000—genuine, actual experiences, not guess-work or estimates.

Our books show that 42% of our alleys have been sold on repeat orders; in other words, nearly one-half of our alleys were sold to customers who had already tried out the game to their entire satisfaction.

We have again been obliged to enlarge the size of our factory to meet the steadily increasing demand; the factory is now 500% larger than it was in 1914.

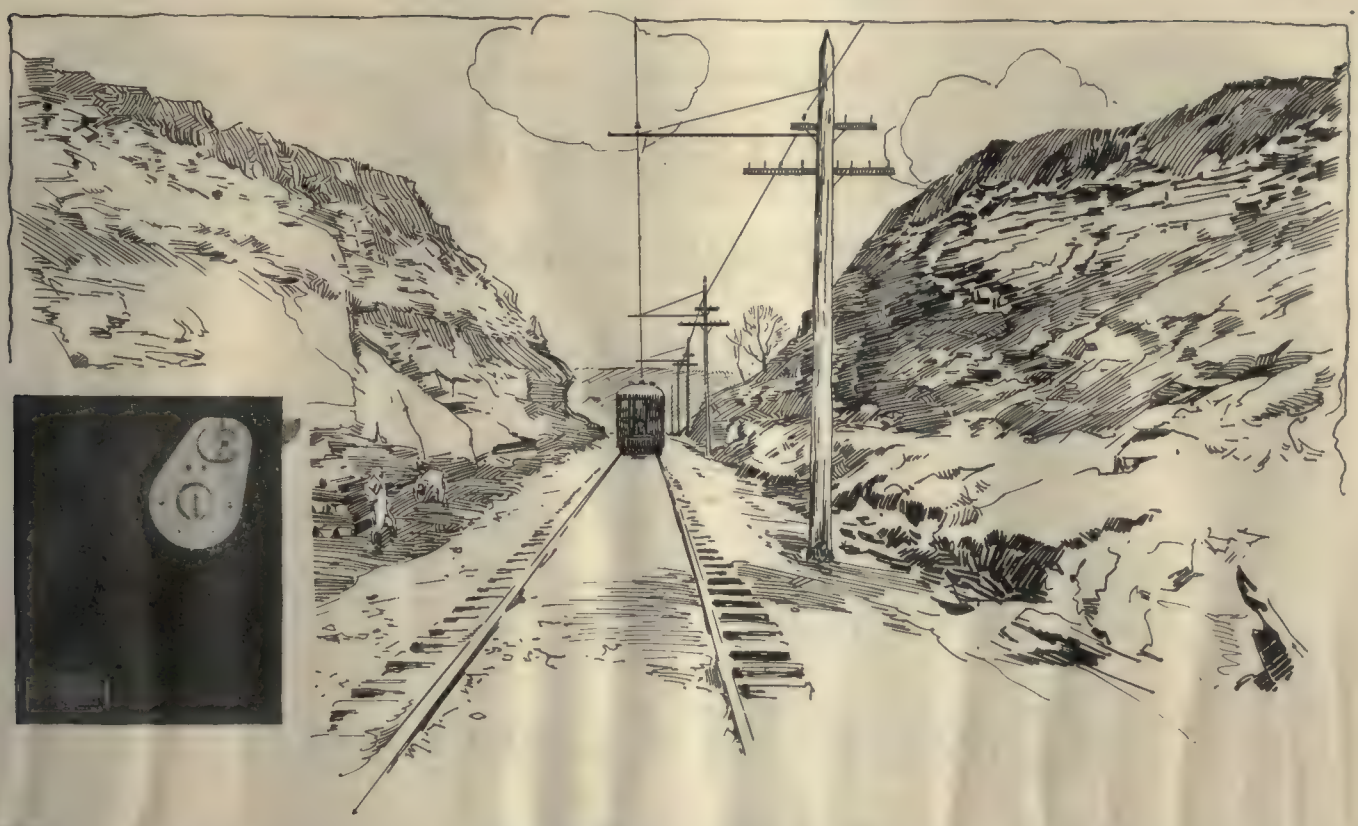
Get your order in now, even if you do not want immediate delivery, as materials and labor are advancing so rapidly that we cannot maintain the present price after February 15th, 1917.

Skee-Ball is fully covered by domestic and foreign patents. Users of infringing games will be prosecuted. They are liable to injunction and for all profits and triple damages.

WRITE FOR ILLUSTRATED CATALOGUE.

The J. D. Este Company

Owners - Patentees - Distributors
1536 SANSOM STREET, PHILADELPHIA



The Missouri Short Line has a Rico Coasting Recorder on Every Car

The Missouri Short Line (Kansas City, Clay County & St. Joseph Electric Railway) is one of the most up-to-date interurbans extant. It was one of the first to appreciate the merits of all-steel center-entrance cars for interurban passenger service, and it is equally progressive in handling freight and express. Naturally a live road of this kind is 100 per cent equipped with Rico Coasting Recorders.

Coasting records under the varied city and right-of-way conditions exceed 30 per cent right along, the record for September 1916 showing 32.5 per cent. Such records with modern, correctly-designed equipment show clearly that the Rico Coasting Recorder embodies

The True Principle for Measuring Operating Efficiency



Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



Grade M Sales Exceed Those of Other Grades



A survey of the business in railway motor gearing during the year 1916 indicates strongly the preeminent success of

Grade M Gears and Pinions

Although all grades of G-E gearing have shown a healthy increase in sales over the previous year, the percentage of increase for Grade M has been the highest. It is also noteworthy that the sales of this grade have steadily increased ever since it was placed on the market.

Out of a total of over 93,000 gears and pinions (comprising 8 grades) sold during 1916, almost forty per cent were Grade M.

This proves that more and more roads are discovering the true economy of

The More-Miles-per-Dollar Gearing

General Electric Company

General Office: Schenectady, N.Y.

ADDRESS NEAREST CITY

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
*Dallas, Tex.
Dayton, Ohio
Denver, Colo.
†Detroit, Mich.
Des Moines, Iowa
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
*El Paso, Tex.
Fort Wayne, Ind.
Hartford, Conn
*Houston, Tex.
Indianapolis, Ind.
Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y
Niagara Falls, N. Y.
*Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio.

*Southwest General Electric Company. †General Electric Company of Michigan

For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.

GENERAL FOREIGN SALES OFFICES, Schenectady, N. Y.; 30 Church St., New York City; 83 Cannon St., London, E. C., England

Electric Railway Journal

Published by the McGraw Publishing Company Inc.
Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLIX NEW YORK, SATURDAY, JANUARY 6, 1917 No. 1

Retrospect and Prospect

LARGER gross and net earnings, accompanied by rising taxes and other expenses; new cars purchased and built a third more than in 1915, with new track a third less; receivership and foreclosure rates about normal; companies giving signs of more intensified traffic development; public showing greater appreciation of railway operating problems and financial burdens; these facts form partly the history of 1916. A glance forward indicates that the recuperative strength shown during the past year will produce encouraging results under the more favorable conditions promised for 1917.

THE ELECTRIC RAILWAY JOURNAL IN 1916 AND 1917

Probably the most striking developments during 1916 in the electric railways of the country were of an economic character, growing directly out of the tremendous industrial revival which marked this past year. This activity brought more traffic to the railways, but greatly increased the cost of their materials and labor. Properly to report the changed conditions in the material market, this paper last April considerably enlarged its department of industrial news, now known as "Manufactures and Markets." Here have appeared interviews on trade conditions with important men in the manufacturing field, articles on prices by purchasing agents, discussions on questions of delivery and other live industrial news. Another phase of the economic development of the year, already mentioned, is that of labor, brought about by the enormous demand for help in manufacturing enterprises. This condition encouraged the activities of electric railway labor agitators, and resulted in a number of strikes, of which the most important was the September strike in New York. Here also this paper not only reported at length the negotiations between the contending parties and before the commissions, but followed up the most interesting single feature of the New York situation, the adoption of the individual contract, by describing its early history in Indianapolis and the experience with it there. From an engineering point of view, the most important development has been the continued improvement in the passenger car, especially in the direction of providing for more rapid passenger interchange. This development was signalized in the Convention Number issued on Sept. 30, 1916, and devoted to "The Development of the Modern Car." The events in the American Electric Railway Association have been reported in the Association News department which is now a feature of each issue of the paper. In this number we present our usual statistics for the year which has just passed. We also publish editorial reviews of progress in the leading branches of the industry, with a survey of its existing economic condition.

The service which we expect to give during 1917 will be even better, we hope, than that given to the industry in the past. While it is impossible in any newspaper to foretell just how each important event of the year will be handled, as the events themselves are shrouded in the future, we can say concretely that we have already arranged for one or more articles on three important topics by well-known authorities. One of these topics is the labor situation, another is public relations and publicity, and the third is the economic future of interurban railways.

ADVERTISING IN COMPANY PUBLICATIONS

An important point in the ethics of public service corporations was raised in a paper on "Railway Publicity," read recently before the Canadian Railway Club by Walter S. Thompson, press representative Grand Trunk Railway, and published in this paper last week. The author was discussing company publications, and while he spoke highly of their value in producing an *esprit de corps* among the employees, he condemned, and properly, the inclusion in such papers of advertisements of supply houses and other firms doing business with the company. We are aware that some electric railway publications carry such advertisements as well as some local advertising directed particularly to the men, but believe that where the practice of soliciting advertisements from concerns which do business only with the company is followed, it has been begun without any particular thought of the merits of the case. Nevertheless, as Mr. Thompson says, there are obvious objections to a railway seeking to gain this form of revenue from any publication which it issues.

The primary objection to the plan is that it involves the acceptance of money by the company without the giving of an equivalent. Those to whom the company publication goes and by whom it is attentively read are not potential buyers of the turbines, motors or other apparatus which are sometimes advertised in its columns or are purchasers in only very small proportion. Hence the circulation which such a publication gives to advertisements of this kind is largely wasted. Manufacturers who are large advertisers recognize this fact, but experience has shown that many of them prefer to submit to petty graft of this kind rather than to run the risk of offending the person making the request, if he occupies a responsible position on the property. This may be cowardice on the part of the manufacturer, but the blame lies primarily with the railway which makes the request directly or through one of its officers.

ADVERTISING AS A BUSINESS FORCE

Advertising ceased long ago to be an indefinite science. If it was, it would be impossible to justify the large sums of money which are spent annually by many large advertisers. The fact is that the principles underlying and controlling advertising are just as definite as those underlying and controlling the flow of electric current in a circuit of known resistance, and investments can be made and results predicated therefrom with practically the same certainty. One of the foundation principles of the expenditures thus made is that in the commercial world advertising is a business force, as necessary in the sale of goods as men, credit, transportation or money. It is not to be confused with charity, with contributions to religious, political or commercial causes or with any other service or thing. Another fundamental principle is that good advertising mediums do not "happen." They are made by service, just as the value of a public utility to a community is made by service, and by painstaking adaptation of means to ends. Mr. Thompson calls the advertising placed by supply houses in railway company publications "policy advertising," by which he undoubtedly means that the manufacturers are afraid not so to spend their money, but this is a reason which is not creditable to the railway company soliciting the business. We are glad to learn from the paper before the Canadian Railway Club that the steam railroads are coming to the view that these publications, when properly conducted, are worth to the companies the price which they cost and that support from outside advertisers can be dispensed with.

Publicity and Good Public Relations

We expressed the opinion recently that the maintenance of good public relations was the most important subject now before electric railway companies. For this reason we have devoted a considerable part of this issue to a symposium on the subject from men who have in charge the work of publicity and public relations on a number of railway properties. This symposium might be considered as a continuation of the series of editorial talks and cartoons which was concluded in our issue of Dec. 23. They discussed the general principles of publicity and the type of man required as a publicity agent. The present symposium opens with a summary by Ivy L. Lee, who dignifies this official with the title "publicity engineer." Mr. Lee tells, among other things, who the publicity engineer should be, how he should be treated by his employer, and how he should perform his functions. In the other articles in the symposium the writers show the application of the fundamental principles and tell what is being done in the way of publicity on different railway properties and how it is being done.

It is possible that there may be some electric railway managers who have the idea that publicity is being urged upon the industry as a specific for a peculiar condition. This is not so. Publicity is as broad as human activity. It is no recent discovery. Its efficacy and the wisdom of its application are unique nowhere. It pertains to electric railways no more than to all other public service corporations. It is not restricted even to corporations. It is pertinent to the prosperity and peaceful conduct of all affairs, governmental or civic, big or little, public or private, corporate or individual, with which any large element of population is concerned. It is the same everywhere and rests on the same basic foundation. Its other name is Mutual Understanding.

There are certain essentials for success with publicity. These are honesty of deed, sincerity of purpose and frankness of method on the part of those in whose behalf it is undertaken; ability and integrity on the part of him who applies it to that behalf, and ultimate fairness on the part of the people who are the jury. The third essential is present always.

There is only one point of possible difference between the publicity practice of utility corporations and that of other interests. This difference lies in the fact that the utility companies are under more critical surveillance and, in consequence, that their adherence to the canons must be absolute and unswerving. For instance, a public utility that lacks in any appreciable measure its share of the essentials mentioned above would be wise not to tamper with publicity.

Again, if any corporation possessed all the essentials it would be compromising its opportunities if it entrusted its publicity to the direction of a man whose own measure falls short of the proper standard. It is undoubtedly true that the spirit of publicity must radiate throughout the whole corporation, and it is only when the entire organization is being ruled by it and living up to it that publicity is accomplishing its maximum efforts. But the one man whose specialty this is must be as big as his work, or the work itself suffers. Then, if the cause is worthy and the manner of its presentation appropriate, publicity is sure of eventual success. It is dangerous, indeed, if misused, but if

directed wisely and courageously it is a mighty and beneficent force.

It is the exception in these days to find a public service corporation which cannot stand the limelight of publicity. But it is also true that those companies which sincerely and consistently invite it still appear to be the exception. We might just as well be frank and admit that the old ideas hang on tenaciously. Many public service corporations have not yet shaken off the archaic reluctance to talk publicly and for publication. They cling to the old error of baffling silence when the public is intent to catch a whisper, of vicarious refusal to discuss topics which they regard as none of the public's business. Everything that has to do with utilities is the business of the public, because the public itself has so decreed, and the public is not going to tolerate indefinitely on the part of any corporation that policy which denies this right.

But it is not alone sufficient that a company should admit the desirability of a policy of publicity. A person might give full assent to the statement that to learn how to swim is good, but that belief alone would not help him much if he got beyond his depth in the water. So with publicity—considered in its broadest sense of making corporation matters public. Professions of willingness to treat the public fairly but without action avail little. But there is ample testimony to the fact that the right kind of publicity pays.

The Organized Safety Movement

The youth of the movement designed to mobilize interest in safety work and to stimulate further development is indicated by the fact that during 1916 the fifth annual convention of the National Safety Council and the second of the Safety First Federation of America were held. The former association started in the industrial field and has had a remarkable growth. The Federation represents especially the public safety movement. The fields of the two organizations overlap in all cases where industries and public are both involved, as they are in public utility operation and particularly electric railway operation. The electric railways are therefore interested in the work of both, and they have taken an active part in them up to the present time.

It is greatly to be regretted that the very promising movement under way during the past year in the direction of organic affiliation of the two safety societies has not yet accomplished its aim. That it will do so soon is to be expected because there is no room in this field for competition or duplication. The accident hazards connected with daily life are increasing so rapidly that every effort must be made to control them. The two organizations have no doubt had great influence so far. United this influence will be far more potent.

The electric railways have rallied to the support of the National Safety Council during the past year and at the Detroit convention, held in October, the electric railway section was conspicuous. The membership in this section is now large enough to make it an important medium of co-operation. It is only as the railways use the section in this way that it can perform its natural and proper function. The council has little to give to the railways but the machinery for co-operation, and if it does not produce the desired results it will be because its function is not understood. The principal work of last year was to get the railways together. Now they must utilize the opportunity thus afforded.

The Safety Federation is so new that the electric railways have hardly as yet had an opportunity to utilize it. However, it does furnish a medium through which municipal and other officials can work with the transportation men in making the streets more useful and safer. It has an active electric railway committee.

Electric railways are perforce in the safety movement as are few if any other industries. In the first place, they are obliged to entrust the inherently dangerous operation of electric cars to a very uncertain class of labor. The increase in the number of motor vehicles, the recklessness of drivers and pedestrians, and the severity with which courts of justice administer the law of negligence, all combine to render car operation difficult and expensive. Again, as far as employees are concerned, the railway incurs many risks incident to manufacturing, while as a power producer and distributor it has safety problems like those of the electrical power industry. It is appropriate, therefore, that the railways, through the national safety organizations and through their own associations, should push the safety movement. That they are doing so is indicated by the amount of space which has been required in the ELECTRIC RAILWAY JOURNAL during the past year to record the new things which are being done. While the Hudson & Manhattan Railroad and the Union Traction Company of Indiana occupied the limelight through the respective awards to them of the Travelers' and the Brady safety medals, many other roads have made very creditable records.

Among the tangible evidences of safety efforts in the railway field there are two classes of exhibits. One consists of warning signs and bulletins, which are now found everywhere. These are good so far as they go, but better are the safeguards actually placed around danger spots. In the shop we find belting and gearing inclosed with frames and screens, floors kept clear of debris, goggles provided for use in eye-jeopardizing operations, etc. In the power plant the switchboard is made foolproof as far as possible, stairways are used in place of ladders, walkways over boilers and piping are provided, and in some cases even railings are installed to protect window washers.

There is, of course, some danger that safety work may become a fad; that talk will be considered a substitute for deeds and that workmen will not take seriously the efforts made in their behalf. However, we are convinced that the movement is meeting a real need, that if followed sanely it will produce good results and that the results of recent progress can be conserved and applied through concerted effort.

The Year in Heavy Electric Traction

Insofar as new installations in the electrification of steam railroads are concerned, the year 1916 has been somewhat barren of results. In Europe, it is true, there has been the adoption of single-phase electric power for the Swiss Federal Railways and the electrification with high-tension direct current on a freight line of the North Eastern Railway in England, as well as a rather "dinky" suburban line out of Manchester. On this continent we have had only the placing in service of the third engine division of the epoch-making Chicago, Milwaukee & St. Paul installation over the Rockies, the interest in which, however, has been largely discounted by the great extent of the work that was done on this project in 1915.

The year, nevertheless, has been exceptionally productive in the way of operating experience. On the two spectacular installations of 1915—the Norfolk & Western and the Chicago, Milwaukee & St. Paul electrifications—the results have been extraordinary in their success. This has been due, obviously, to the fact that both lines undertook, for the first time in the history of electrification, to handle freight on a large scale. The dominant feature of both has been the displacement of somewhat more than three steam locomotives by each electric machine. In both cases train loads have been increased very materially, and train speeds have been practically doubled.

Here we have, at last, something definite upon which to base conclusions as to the future of electric operation of trunk line railroads, and every conclusion that can be drawn points to a great extension of electrified track within the near future. At the present time a great number of projects and rumors of projects are in evidence, and it is unquestionably the fact that much of the electrification work now being considered as a possibility has been due directly to the records made available during the past year.

Of the definite new projects the two most ambitious are that of the New York Central, including the west-side tracks in New York City, and that of the Illinois Central, including its lake front terminal in Chicago. Neither one offers anything in route mileage that approaches the Milwaukee's electrification across the Rockies, but at that both will be remarkable for the density of the traffic that will have to be handled. In addition it is practically a foregone conclusion that the New York Central's electrification, which will involve handling all the road's heavy freight trains over some thirty miles of the main line, will end in the extension of the electric zone to Albany, about 100 miles farther north. On this division the traffic is so dense and so continuous that it is actually feasible to use 1200-volt current. At present trains of great length are being handled by steam in remarkable time, the entire division being on the flat grade of the Hudson River, and this serves to cut down the margin between the effectiveness of steam and electric motive power. Nevertheless, there is a good possibility of the service being electrified solely on the grounds of operating economy.

Other than this, the projects now in the air are generally those which involve heavy grades, where the electric locomotive has the special advantages of unlimited power and superior tractive efficiency, both tending toward the establishment on the mountain divisions of train loads that are equal to the tonnages handled on level divisions as well as to the maintenance of reasonably high train speeds. On mountain divisions also the element of regenerative braking affords another advantage to the electric locomotive, the year's experience having shown that this method of handling trains is thoroughly practical from an operating standpoint, although as yet no basis is available for estimating the extent to which it increases maintenance costs.

In conclusion it may, perhaps, be said that the past year has been one of watchful waiting in electrification. The outlook for 1917 is more than promising as regards new projects, mainly for the reason that many doubts on the ability of electric traction to produce results have been set at rest through the record of definite accomplishment.

How Earnings Have Held Up

Just as in periods of panic or depression one finds in electric railway and other utility earnings a marked stability, so in the days of rapidly expanding prosperity one does not expect to find utility earnings so inflated as those of many other companies, particularly industrials. For this reason, the unparalleled earnings records that were made by many manufacturers in the United States during 1916 had no counterpart in the electric railway industry during this period, although appreciable advances appear to have been made in the latter field. Electric railways as a whole are still far from being inclined toward prompt co-operation in the matter of furnishing earnings statistics, but from figures thus far obtained by the information bureau of the American Electric Railway Association it may be possible to give some indication of the trend of their earnings.

For the fiscal year ended June 30, 1916, as compared to the similar preceding period, the operating revenues for about 8700 miles of line out of approximately 30,000 miles showed an increase in gross operating revenues of 3.47 per cent, in operating expenses 2.40 per cent, and in net operating revenues 5.15 per cent. During the first six months of the calendar year 1916, as compared to 1915, this showing seemed much improved, for companies operating about 7450 miles of line increased their gross operating revenues 8.08 per cent, and their net operating revenues 12.10 per cent, operating expenses rising 5.68 per cent. To bring the record as far as possible up to date, the results for the first nine

months of 1916 indicate that the gross operating revenues for about 7400 miles of line rose 6.26 per cent, the operating expenses 5.13 per cent, and the net operating revenues 8.06 per cent.

Comparisons between the foregoing figures must naturally be somewhat elastic on account of the diverse mileage involved, but it seems to be assured that the earnings for 1916 will show up much better than those in 1915—probably to the extent of 7 per cent in gross and 9 per cent in net. During the year the Eastern and the Southern districts in the main continued to report improvement, and in the last reported quarter, July-September, an encouraging gain was also noticeable in the Western district, where the jitney competition on the Coast and the peculiarly persistent business depression in the Northwest had been such disturbing factors. With such general improvement the showing for the whole of 1916 would probably have followed closely that for the first half if it had not been for the losses incurred in the third quarter in connection with the New York strikes. According to the public service commission reports, the operating revenues of the metropolitan surface lines concerned fell off 50 per cent in September, 1916, as compared to September, 1915, while the operating expenses decreased only 30 per cent. These decreases had a considerable effect upon the general totals for the third quarter, and without doubt account for most if not all of the poorer results for the first nine months of 1916 than for the first half of the year.

While general increases in gross and net were thus secured in 1916, this result is not ground for unlimited optimism, for it was obtained only after a most strenuous struggle with the rising costs of labor and materials, as indicated by the above stated increases in operating expenses. That was not all, however, for the gain in net operating revenues was accompanied by added tax burdens to the extent of 3.04 per cent for 7700 miles of line in the last fiscal year, 6.58 per cent for 6400 miles in the first half of 1916 and 7.05 per cent for 6400 miles in the first three quarters of 1916. For neither of these groups is there much hope of immediate betterment. Such relief in labor costs is not possible, and while some materials whose high cost has been based largely on war usage will relapse sharply with peace, the general high prices of materials will probably not soon be forced down to the pre-war levels. Nor does it appear that there is any widely growing recognition of the fallacy of lessening the effectiveness of transportation systems to make them tax gatherers or any more serious study of the proper incidence of taxation.

Because of these facts, although the possibilities arising from the settlement of the European war present no terrors to electric railways and other utilities as compared to industrials, the future could well be much brighter for electric railway earnings. The point of the whole matter is that the companies cannot long continue to meet rising expenses with a practically fixed income; many of them are seriously pinched now. A greater traffic development will help some lines, particularly interurbans, but for the industry as a whole, in the absence of a cataclysm that would sweep away high operating costs, the fare unit must be increased or some fare system adopted that will give more adequate recompense for the service rendered. In the last three calendar years forty-nine electric railways secured fare increases of various sorts, but this is only a drop in the bucket. Many more increases are needed, and the sooner electric railway officials try in concert to show the fallacy of a sacrosanct 5-cent fare, the better it will be for the industry.

Converging Aims in Car Design

The close of the year 1916 is a particularly fitting time for consideration of the immediate goal toward which recent developments in electric railway surface cars are leading the industry. During the year certain definite ideas seem to have become common to practically all who are interested in the design of cars for city service, and although the revolutionary changes that began some four years ago are still going on, there is no question but that sentiment has reached a well-defined state of crystallization in regard to a number of features of marked importance. This, we believe, can only mean that the first step is being taken toward standard city cars—something which practically every one favors in the abstract, but which as a concrete matter is opposed because of supposititious difficulties of establishment. Insofar as interurban cars are concerned, there is no doubt that many of the same factors apply, but it is in the case of the city car that they are most strongly emphasized, thus making the latter the better basis for consideration.

During the past year the record of new construction for city service, confirming the indications exhibited in 1915, has shown very definitely that the open car is dead. With it has gone the fully-convertible car, leaving for future general types only the closed car and the semi-convertible car, which differ from each other merely in trifling detail. The year has seen, also, a practical settlement of the question of all-steel versus semi-steel construction, since the rapid growth in popularity of steel side posts and carlines demonstrates beyond a doubt that the use of wood, except for floor and roof sheathing, will very shortly disappear altogether.

With regard to less general or more detailed features of the car body, the record of the past year has shown that the arched roof is thoroughly established, because the original opposition to it on the ground of ventilation has been finally dissipated, the largest company that retains the monitor deck having actually adopted the plan of closing up the deck sash and installing half a dozen automatic ventilators in their place. The use of interior bulkheads is also very much on the wane, in view of the rising popularity of the fully-inclosed,

pay-within car, which in addition has produced a tendency toward uniformity in platform design for end-entrance cars, including door width and radius of crownpieces. A practical standardization has already taken place in regard to the use of a transverse seating arrangement with longitudinal seats at the doors, and at the same time has come the adoption of a seat spacing (coinciding in all recent cars with the distance between side posts) that now falls, without exception, within a range of less than 2 per cent from the mean.

Here, indeed, are the elements of a standard car, provided the two questions of general dimensions and door arrangement could be settled. Of these the latter appears to be most formidable, because the center-door principle has received another lease of life through the new front-and-center-door designs, and in case these fulfill their present promise, they will constitute formidable and permanent rivals of the end-entrance design. It seems, in fact, impossible to consider the standardization of door arrangement at the present time. This does not, however, stand in the way of establishing a standard end-entrance car which, regardless of any reasonable growth of the modified center-door idea, could undoubtedly be used for many years to come, nor does it even stand in the way of the demand for "this year's model," mentioned by W. H. Heulings in his recent able article on standard cars. "This year's model" does not have to be a freak. In fact, experience has shown that radical changes in design are never acceptable to the electric railway industry, and that the novelties which go to make up a new model are invariably subordinate in character.

ARE STANDARD DIMENSIONS POSSIBLE?

If, then, the question of door arrangement may be left aside to be settled by future years of experience, there remains no very serious obstacle to standardization of car bodies, at least from the user's standpoint. As we have mentioned in previous issues, an overall length of 45 ft. might be arbitrarily adopted as standard for double-truck city cars without being more than 5 per cent away from the dimension now used in practically any one of the important cities in this country. Expressed in terms of capacity, this means four seats, and it would require considerable hardihood, even for supporters of the "local conditions" theory, to argue that such a small change could make a vital difference in operating results.

In the same way a width of 8 ft. 4 in. would be suitable for practically every large city, and, to go a step further, as Mr. Heulings has done in his article, a width of 8 ft. 2 in. would be suitable, with rare exceptions, for any community, large or small. For a city where an 8-ft. 6-in. width is permitted, the suggestion of using a narrower car doubtless would not be welcomed, yet it is safe to say that the great majority of city railways whose clearance lines permit such ample widths are not, to-day, making the most of their opportunities. Thirty-five-inch seats with, say, a 25-in. aisle give about all the space that any city car really needs, and these dimensions may be attained with an overall width of 8 ft. 2 in. When greater overall widths have been provided, it is quite the rule to find no wider seats or aisles than those just mentioned—the extra space in nine cases out of ten is wasted in unduly wide side walls which, instead of being confined to the easily attainable dimension of 1 in. in thickness, frequently run up to 3 in. or even more for no explicable reason.

In the case of the double-truck car, therefore, the question of standard overall dimensions is no longer a serious matter. Nor is it any more serious in the case of the single-truck car, which has a definite place in small cities where travel is light. For such equipments a length of 33 ft. has become so nearly a universal rule that it would already constitute a standard except for the incomprehensible and unnecessary variations of a few inches over or under that appear in recent cars. This, of course, excludes consideration of the one-man car whose length may be very much less than 33 ft., but here is, of necessity, a novel and little-understood type of equipment that cannot well be included, at least for the present, in any discussion of standardization. It is, as a matter of fact, a distinctly separate development that gives every indication of running its own course absolutely without regard to the older types of design.

NEXT STEP TOWARD STANDARDIZATION

From the user's standpoint, then, it has now become possible to establish a standard car by arbitrarily assigning average overall dimensions and by following the most commonly-used designs for vestibules, roof contour and seat spacing. This, it would seem, is all that the user is really interested in, since the details of construction are primarily the affair of the manufacturer, and are not likely to be improved upon by those who are operators rather than builders of equipment. Indeed, we believe that much of the existing chaos in car design has been due to the interference of railway maintenance departments with construction details—something that might far better be left to the specialists in construction. Even so, there is sufficient divergence in the ideas of the many different builders of car bodies to offer a wide choice in structural details to the purchaser of a car that had standard overall dimensions and standard general features. What the purchaser wants is a car of minimum weight and price, and of maximum durability, and a distraction of his attention to such petty complications as variations of a few inches in length, or differences in roof contour, or the relative advantages of continuous or independent side-posts and carlines can only obscure the final object.

Granting this, as well as the possibility of bringing a respectable number of railways to use a standard car, it seems to us that the next step should be a definite estimate as to the actual, tangible advantages accruing to the user through standardization. If the gain is found to be of considerable importance, there is little doubt but that the industry could be induced to indicate general dimensions and outlines which would be acceptable as standard at least for a large number of com-

panies, but which, of course, would not have to be used by all. For the ensuing year, therefore, we would commend this question of economy effected through the use of a standard design to the car builders. From no other source could any kind of an answer be obtained, and without an answer it might well be that the present ripe opportunity for establishing a standard car would be lost altogether.

Keeping Track Costs Down

In the way departments of electric railways, the year 1916 will be remembered as one marked by a great scarcity of labor and consequent high wages, delayed deliveries and almost prohibitive prices of materials. As a result much necessary track work was postponed until conditions will have adjusted themselves. In many cities the authorized work could not be completed because sufficient labor could not be had, and in others material deliveries were responsible for incompleted programs. To counteract this labor situation much attention was directed toward increasing efficiency in the handling of materials. Many engineers turned to power tools to speed up their work. Pavement rooters in several instances supplanted the pick in the hands of a laborer. Steam shovels, dump cars and auto trucks were substituted for hand shoveling and teams. Derrick cars were quite generally used for handling the heavier track materials, and concrete mixing plants of various kinds and capacities greatly reduced the forces necessary to place this material in the track. Pneumatic tamping outfits, drills and spike drivers—all had a prominent place in track work, and each played an important part in supplanting labor.

Despite the critical situation that existed in 1916, the end does not yet appear in sight. Rail prices were advanced $10 per ton during the year and prices for special work and other steel products were also increased in the same or greater proportion. In fact, abnormal advances in prices were recorded all along the line, and indications are that further advances will be made. How much more the electric railway companies can stand and continue construction and rehabilitation programs is problematical. It is true that earnings showed substantial gains, but these were needed to make up for the losses of past years. On the other hand, the period of retrenchment on many properties had been prolonged until renewals and reconstruction were absolutely necessary. Hence, it was not surprising to find that this class of track work rather than that for extensions predominated.

Special Work and Better Construction

In the special-work specifications which were submitted in final form by the 1916 way committee and adopted as standard by the American Electric Railway Engineering Association, a valuable contribution to the industry was completed. Special-work manufacturers co-operated in the preparation of these, and they are anxious that the specifications should be used generally because they insure a common bidding basis. Undoubtedly these specifications will be amended to meet new conditions as they arise, but in their present form they are as complete and satisfactory as most thorough consideration could make them. In connection with special-work purchases during the past year it is interesting to find that machined-bearing insert settings and flange bearings were very generally specified, and all manufacturers are now prepared to supply this demand. We feel that our efforts in this direction were largely responsible for this change and are not only gratified but sure that it will be of great benefit to the industry.

Another development has been the general drifting toward higher standards of track construction. There was a marked increase in the mileage of track laid on concrete foundations. Where natural drainage conditions were good this change was not so marked, but elsewhere the increased bearing to be had with concrete track foundations insured greater permanence to track line and surface. Moreover, the advantages of the principle adopted by the Board of Supervising Engineers Chicago Traction at the beginning of the extensive track rehabilitation program in that city have been accepted by many other companies, and a track substructure on which rails could be renewed has been growing in favor. In an industry such as the electric railway, where the margin of profit is small, permanence in the physical property is vitally important. Undoubtedly the findings of the comprehensive study of rail corrugation made in Chicago to determine the relative merits of concrete and ballasted track in this respect will influence other companies to adopt concrete track foundations in their future programs. In this study it was shown that rail corrugation was as prevalent on one type as the other and that the phenomenon was not a respector of age or conditions.

Rail Heads and Rail Corrugation

Incident to the rail corrugation problem and more closely related to the rate of rail wear has been the introduction of curved head rails. Chicago's study of rail wear pointed to the advantage of a change from the ordinarily used flat-head rail to a curved head. The curved-head rail has been used successfully in England for a number of years and a few years' experience with it in this country indicates that by its use the rate of wear on wheels and rails will be greatly retarded. During the coming year the way committee will consider the question of designing a curved-head grooved-girder rail section. To facilitate this work and insure perfect harmony the equipment committee has been asked to co-operate in so far as such a head will affect the wheel tread and flange. It appears that the curve of the rail head should conform to that of an average worn wheel. The problem before these committees is to determine whether the average contour of worn wheels is sufficiently close on all properties to permit the adoption of a standard rail head section, or whether this section must be prescribed for each company. It appears reasonable to expect that where different rail

sections and wheel contours are used the form of wear will vary. In some rail purchases a 20-in. curvature has been specified, while in others a 12-in. radius curve was used. Inclined curved head rails are limited to the grooved-girder sections, but this has not prevented the users of plain girder and standard-section rails from taking advantage of the full-line-of-contact principle. The first tilted or "cocked" rail track was built in Cleveland, Ohio, in 1915. Considerable of this type of construction has been added in the past year, as several other companies purchased steel ties designed to hold the rails in this tilted position and built track of this type. The cocked ties incline the rail so that its head conforms to the slope of the wheel tread and thus provides a full line of contact. In connection with rail tendencies it is also interesting to note the increasing popularity of the 7-in. sections as a substitute for the 6-in. and 9-in. rail in both the plain and grooved-girder sections.

Rail corrugation, as usual, received its share of attention during the year. Several old causative theories were exploded and new ones advanced. It was pretty clearly brought out that curved head rails are not a cure but do postpone the appearance of rail corrugation. A microscopic analysis of the mechanical properties of corrugated rail conducted by H. M. Sayers, revealed nothing new in the way of a remedy. Perhaps the vibration theory is still held by the largest number of people, but the remedies based upon this theory, where they have been used, have failed to cure the disease. According to this theory, ballasted track should offer a cure, yet the study in Chicago revealed corrugations on both types. It may be, of course, that the ballasted track was not sufficiently flexible to eliminate corrugation, but it is hard to see how greater flexibility could be introduced in track in paved streets without introducing greater complications. It has been repeatedly shown that rigid track construction is absolutely necessary to permanent line and surface—both vital requisites to minimum pavement maintenance. Where pavement maintenance costs are practically the same as track maintenance costs, it ill becomes any engineer to change his type of construction so as to increase the cost of the former. In other words, until a remedy is found which is less damaging than the disease, it appears advisable to follow the practice of the past and remove rail corrugations by grinding.

The Joint Problem

Welded, riveted and drive-fit or high-elastic-limit bolted joints are being almost exclusively used by the progressive companies for their track in paved streets. It is useless to argue that the old-style mechanical joint will "stay put." The bolt and joint fit clearances are too great to provide absolute security, and the substitution of the drive-fit, high-elastic-limit bolt is a logical change and will unquestionably obviate many of the difficulties of the past. The electric welder and the thermit weld have brought the welded joint within the reach of all companies, and the ease of repairing isolated joint failures commends them. Both of these processes are not limited to use at the joints but have permitted the introduction of innumerable economies in making repairs to steel of all kinds in electric railway operation. The cast-welded joint and the Lorain type electric-welded joint are equally efficient with the other types of welded joints, but one requires an expensive plant and the other may only be bought under contract for the installation of a large number of joints. Finally, it is folly to use the same type of joint in expensive track in paved streets as in open construction, simply because they are uneconomical. For a time during the past year the prohibitive war prices of spelter and thermit greatly curtailed the use of the Nichols and thermit joints, but this situation has practically readjusted itself.

Cost Analysis Accounts Necessary

Whether track materials and labor are being purchased at war prices or not, it behooves electric railway engineers to analyze all their costs in order to introduce economies. It has been particularly evident during the year just past that more and more attention is being directed to unit costs. Most of those published, however, were construction costs. While it is important to keep down construction costs, it is of more importance, to our mind, to minimize maintenance costs. The efficiency of various types of track and materials can only be determined by a comparative analysis of maintenance costs. Whether this be done on one property or as between different properties is unessential so long as an analysis is made. It is but natural that engineers should delight in construction and dislike maintenance, but it is the latter phase of their work where the real savings may be made for their companies. It is only through maintenance experience and analysis that economical improvements can be made in construction. Whether the interest and depreciation on expensive track more than offset the higher maintenance of cheaper construction is a question all way engineers must be prepared to answer in the course of the next few years.

THE problems of electric railways are the problems of the communities served, and in increasing measure as these problems become more complex it is essential that the community vision be clarified if the interests of both parties are to be properly served.—James H. McGraw.

Equipment of the Power Plant

In reviewing power plant progress it is convenient to consider separately the boiler room and turbine room of the steam plant, with their respective auxiliaries, and other general matters which relate to steam and other plants as a whole. This year we shall confine attention to the steam plant, although this does not imply that progress has not been made in water power, gas power, and oil power plants as well. For the electric railway operator, however, it seems that the most significant progress has been made in the steam plant.

The Boiler Plant Is Improving

There is no doubt that after a long period of comparative neglect the boiler room is now getting its proper share of attention. This is in part due to the demand for higher pressure caused by steam turbine development and also to the objectionable bulk of the boiler compared with the turbine for which it furnishes steam. In partial explanation of the slowness of boiler improvement it may be said that the opportunity, and hence the incentive, for saving was less here than in the engine room. At present, further reduction in steam consumption in the turbine depends largely upon the ability of the boiler to produce higher pressure. At the recent A. S. M. E. meeting in New York a speaker claimed for a certain boiler plant, not in electric railway service, a sustained efficiency of 90 per cent. In view of the numerous although individually small sources of loss a performance like this cannot be expected under ordinary circumstances. The present excessive cost of steam coal, however, should stimulate boiler operators to get along with a minimum quantity of this precious mineral and to provide ample storage facilities in future.

In going to higher boiler pressures there is evidence that the makers are prepared to furnish what is demanded. There are practical limitations, however, set by first cost and maintenance cost, heat losses and leakage, as well as hesitation in departing from standard practice. An example of a high-pressure plant is one installed this year by the Public Service Company of Northern Illinois in which the pressure is 350 lb. per square inch and the superheat 225 deg., Fahr. It is to be expected that pressures will be increased gradually as design and construction are perfected. The standard boiler code of the A. S. M. E., adopted last year, will no doubt exert its influence in steering design along conservative lines.

Aside from the matter of pressure, there is no doubt a tendency also toward improvement in increasing heating surface. With one notable exception, in the main plant of the Detroit Edison Company, the popular size of boiler has contained 6000 sq. ft. of heating surface or less, producing roughly 600 (so-called) boiler horsepower or less. There is no reason for not going to larger sizes excepting the natural desire for standardization, but this cannot, of course, be controlling. At any rate, the demand henceforth is going to be for more heating surface per unit. The amount of steam which can be produced on this surface is determined almost entirely by the furnace.

The Furnace Is a Separate Proposition

In the line of furnaces there is a steady demand for all three general types of stoker, the underfeed for use with forced draft, the inclined overfeed for natural draft and the chain grate. In spite of the more spectacular results obtained with the first-named type, which is eminently adapted for peak load work, natural draft is still relied upon in many plants. The use of oil in furnaces has not been forgotten either, but in general this fuel cannot compete with coal on a cost basis. Although oil as a fuel is attractive from the standpoint of convenience and cleanliness, these advantages are becoming less important each year as the apparatus for handling coal and ashes is perfected. In a modern plant the labor element in the boiler room cost has become entirely reasonable.

It is to be regretted that little progress has as yet been made in popularizing a substitute for the unit known as the boiler horsepower. All engineers recognize the inconsistency of the present practice, particularly as output depends to so great an extent upon the furnace, but they seem not to be able to get together in the matter. The good work should be kept up, however, in the interest of consistency. Electric railway engineers can exert considerable influence to this end.

Where Will the Turbine Stop?

At the moment the situation in the metal market is affecting deliveries of steam turbines, but great progress is being made in the turbine room as well as the boiler room. The most remarkable thing is the scale upon which large turbines are being purchased, speaking in general terms of the past year or so. Remodelings like that of the Virginia Railway & Power Company's plant, described in a recent issue of this paper, are going on everywhere. That the power plant is able to stand the expense involved in the development period of a new prime mover like the steam turbine and at the same time produce its output at less cost is highly creditable to the engineer.

There seems to be no limit to the size of the turbine, large or small. In large units there are some under construction to produce outputs of 70,000 kw. in three cylinders, and a single-flow turbine recently ordered will deliver 45,000 kw. from a single cylinder and generator. In small units the turbine is increasingly appreciated for driving auxiliaries, as it is compact and rugged. As its exhaust is used for feed water heating the water rate is not a prime consideration. Geared turbines, particularly for direct-current generator drive, are also being called for more and more. The types of turbines now in use between the extremes in size mentioned comprise tandem-compound turbines with one generator and cross-compound with two generators. The three-cylinder turbines referred to, designed for

the Interborough Rapid Transit Company, are of the two-stage type and drive three generators each.

THE CONDENSER IS MAKING NOTABLE PROGRESS

Condensers have been improved to keep pace with the turbines which they serve, as is evidenced by the fact that surface condensers of as high as 56,000 sq. ft. condensing surface are being built and a jet condenser for a 45,000 kw. turbine is on order. The preference is for surface condensers, but the business in jet condensers continues to be good. Barometric condensers are being constantly improved. In surface condensers the problem is to produce straight line flow of steam to eliminate friction loss.

In auxiliaries the steam turbine furnishes a popular drive for circulating and air pumps, although the reciprocating vacuum pump and slow-speed circulating pump are still preferred in some cases. A so-called "heat balance condenser" has also been developed in which the pump load on a jet condenser is divided between a turbine and an electric motor. This permits the turbine to furnish just the amount of steam required for heating the feed water.

A NEW APPLICATION OF THE PHASE CONVERTER

The electrical end of the turbo-generator unit has, of course, been improved with the steam end. This has been accomplished through refinement in design. Temperature rise, allowable and actual, has had even more than usual attention, and an effort has been made to interest users in keeping track of internal temperature rises through the use of suitable instruments. Power plant operators concerned with the furnishing of single-phase power particularly for railways have been much interested in the application of the phase balancer or phase converter by the Philadelphia Electric Company, which supplies power for the Philadelphia-Paoli electrification. This apparatus applies the principle of the revolving field somewhat as was done in the phase converter used on the Norfolk & Western locomotives, where single-phase power is drawn from the line and is converted to three-phase for the motors. By an ingenious adaptation this principle has been applied in a machine which can be placed away from the power plant on the three-phase line and will automatically transfer load from a heavily loaded phase to the others.

It would be unfair to an important movement to close this brief review without a reference to the commendable zeal of power plant operators in safeguarding dangerous machines, circuits and other sources of possible accident. New plants are being designed with this element conspicuously in mind and the older plants are being brought up to date rapidly, as is explained more in detail in another editorial.

Protecting the Overhead System

In the power distribution field the work of the year has been in the way of an intensive study of existing apparatus and methods with view to increasing the reliability and safety of service and to securing economy in operation rather than the development of new apparatus and radically different systems of distribution. As reflected by published articles and the work of technical society committees, state commissions and federal bureaus, the leading thought of the year seems to have been protection. The term "protection" as here used covers two categories; protection of service and protection of employees and others from the hazards incident to the rendering of that service.

INCREASING RELIABILITY OF TRANSMISSION LINES

The increased attention on the part of the railway companies to the matter of power sales work, the large energy supplies required for industrial purposes, and the heavier railway traffic all have tended to increase the demand for a service which shall be without interruption. It is not surprising, therefore, that at the present time engineers are giving much time and thought to minimizing the number of interruptions of service and the time per interruption. Devices, such as arc suppressors, electrolytic lightning arresters, current-limiting reactances, isolating transformers, better insulators and motor emergency trucks, which assist in accomplishing these ends are gaining rapidly in favor. As illustrative of what may be accomplished by paying careful attention to the matter of lightning protection may be cited the experience of the Commonwealth Edison Company, as described by D. W. Roper in papers presented at the annual conventions of the American Institute of Electrical Engineers and the National Electric Light Association. This company, by the use of improved methods of protection, has been able to eliminate 90 per cent of the troubles caused by lightning. Along the same line may be noted the experience of the Beaver Valley Traction Company, described in the ELECTRIC RAILWAY JOURNAL, Jan. 8, 1916, page 89. By the use of carefully wired electrolytic arresters on their cars this company has been able to reduce its motor trouble caused by lightning to an almost negligible amount.

So important is the matter of good transmission line insulation from the standpoint of continuity of service that there is a feeling, in some quarters at least, that it is better engineering either to weed out defective insulators or to reinsulate a line than to provide a duplicate line. Tests for detecting faulty insulators on both dead and live lines have been more fully developed during the year, and, while still not infallible, a large percentage of the bad insulators on a line may be located by their use. Methods for replacing defective insulators on high-voltage lines with the line in service have also been developed.

THE PROBLEM OF INTERCONNECTING TRANSMISSION LINES

The interconnection of the transmission systems of electric railway and power companies seems to be a growing practice and one that is highly commendable.

If properly carried out it prevents absolute shutdown, reduces the amount of reserve equipment necessary and promotes economy in operation. Broadly considered, a transmission system is a transportation system just as much as is a railway system. In the early days each railway formed a separate little unit and the present interconnection of systems has been a gradual development. Such connections, however, have so facilitated transportation that their severance would be, as we look at it now, little less than a national calamity. It seems reasonable that the facilities for the transportation of electrical energy should be just as flexible and as well interconnected as are the facilities, say, for the transportation of coal. The problem of interconnection is one, therefore, that we feel should receive in the future even more attention than is now being bestowed upon it. The interconnected system of railway and power companies centering at East St. Louis, described in the ELECTRIC RAILWAY JOURNAL, Jan. 22, 1916, page 156, is a good example of what might be done with profit by many companies in other sections of the country.

The second phase of protective work, namely, the minimization of life hazards, has received an unusual amount of attention this year. Not only have individual companies been paying particular attention to their safety work, but the labors of the Bureau of Standards in connection with the National Electrical Safety Code have tended particularly to emphasize this phase of protective work. Objections to the code have been well aired before technical societies and in the engineering press, and, therefore, will not be reviewed here. Whatever its faults are as a code, however, it cannot but be admitted that it has had considerable educational value and that the many joint meetings held over the country for the purpose of discussing its various features have tended to develop a get-together spirit which should hasten the general standardization of many of the minor details of line construction.

THE WORK OF THE ENGINEERING ASSOCIATION

The American Electric Railway Engineering Association committee on power distribution faced a large number of problem assignments when it began its year's work; too many one would think on first sight. Nevertheless, the committee's record is one of much valuable work accomplished. The consideration of standards of other societies relative to overhead work with the view of weeding out inconsistencies, the review and revision of the existing association standards on the subject and the work on joint committees were among the important features of the year's work. An exceptionally well prepared technical discussion of the theory of concrete poles was contained in the committee report, as was also a rather exhaustive study of the various third rail constructions now in use. A number of new sections were added to the recommended specifications for overhead line material and information relative to high voltage direct current and catenary trolley construction preparatory to the formulation of standard specifications for such constructions was gathered. The formulation of the specifications is one of the important tasks set for the succeeding committee.

DEVELOPMENT WORK IN POWER TRANSMISSION

The study of the effect of altitude on apparatus ratings and the use of the grounded neutral constituted the bulk of the work of the American Institute of Electrical Engineers committee on transmission and distribution. No attempt was made by the committee to determine an altitude correction factor, but a consensus of the opinions gathered from operating engineers seemed to indicate that altitude should be given some consideration at least in loading apparatus of standard ratings. The question of the grounded neutral versus the ungrounded one is largely a matter of protection of service and apparatus. As one might expect, what would be best for one system might not be best for another, but as a result of its work the committee seemed to feel that the grounded neutral offered most advantages when the line voltage was above 60,000.

THE RETURN CIRCUIT

The work of several national joint committees, commented on in our review of last year, has been continued, although as far as reports are concerned the committees have been marking time pending final action on the National Electrical Safety Code. It is expected that the report of the national joint committee on electrolysis will be published shortly. As its work will represent the combined efforts of a number of associations represented by eminent engineers, this report will constitute a high authority on the subject. The notable series of electrolysis investigations by the Bureau of Standards have been continued and several valuable technical papers bearing on the subject have been published. Among other things, the investigations of the bureau have shown that corrosion is practically negligible where the cycles of current reversal are shorter than one minute. The conclusion is that, in the so-called neutral zones of railway networks, where the currents in underground structures are continually reversing, the damage chargeable to electrolysis is less than would be expected from a consideration of the arithmetical average of the current discharged to earth from the structure. The three-wire system as a means of electrolysis mitigation is being installed at Springfield, Mass., under the directions of the Bureau of Standards experts. Such a system has been in service on 125 miles of track in Los Angeles for nearly two years. The experience there seems to be that under favorable conditions, where there is a sufficient number of feeders, such a system costs les sand has lower losses than the better known insulated return feeder system.

The problem of maintaining the return circuit is very closely related to that of electrolysis. The elimination of electrolysis and poor bonding are certainly incompatible, and the problem of bond maintenance seems to be largely that of joint maintenance. In city service welded joints are being used more than ever before. The same may be said of the welded type of

bond, and it is of interest to note that several of the new bond welding devices are of such nature as to permit the work of bonding to go ahead without interrupting service.

Electric Railways are Considering Substitutes for Copper

The high cost of copper and aluminum in this country during the past year has focussed the attention of American engineers on the conducting problem. Considerable information relative to the electrical characteristics of iron and steel wire and cables has been published and, where climatic conditions are not adverse, there seems to be a growing tendency to use such conducting materials on lightly loaded distributing circuits. The use of specially-spiralled cables for railway feeders has been suggested, and in this connection it has been pointed out that the higher inductance of the magnetic conducting material would increase the protection of substation apparatus. While this is true as far as substation apparatus is concerned, experience with third-rail systems would seem to indicate that, upon the interruption of a short circuit or other heavy current, the discharge of the energy stored in the magnetic field in the feeder itself and the surrounding air would increase the duty imposed upon the control and motor equipment of the cars. As illustrative of the greater possibilities in the use of iron or steel may be mentioned the return circuit construction used on the recently electrified section of the Lancashire & Yorkshire Railway, where a fourth rail is used for the return circuit.

A Complex Year for the Manufacturers

The manufacturer of electric railway supplies during 1916 experienced conditions that may safely be defined as chaotic. Material and labor conditions have never been more complex than they were last year, but out of the complication has come a stronger group of manufacturers, more willing and more able to serve the electric railway industry.

To summarize the problems which have confronted the manufacturers during the past year is difficult, because conditions have changed so rapidly. For instance, a year ago that manufacturer whose income was largely derived from sales to electric railways found himself in very serious circumstances. For three or four years the roads had not been buying in substantial quantities, each year the buying was growing less and the cost of manufacturing and selling was increasing. In the face of rising costs and a diminishing market, the year 1916 bid fair to be a lean year. Until late spring there was little prospect for sustenance on the part of those whose bread and butter came largely from sales to electric railways. Then the roads in the eastern industrial districts began to buy. Later on traffic increases for the roads in the Central States prompted buying activity there. Then the rush began.

Having deferred purchases so long because of lack of money and because of high prices, the electric railways, when they did begin to buy, really needed prompt deliveries. Most of the buying was to meet deferred maintenance. But other industries had begun to buy earlier, and the material and labor situations were so tense that the electric railways had to wait their turn. And in most instances it was a long wait. Only within the last few weeks have manufacturers been able safely to make promises of deliveries.

Production Conditions Still Unsatisfactory

Production conditions are now far from what the manufacturers would wish, but they are on the mend. The larger concerns have finally established sources of supply for most raw materials so that delivery of finished product is now more nearly determined by the speed of factory production. Of course there will always be special jobs offered, which, if accepted, would interrupt factory procedure. But this year the manufacturer, backed up by good orders for his standard products, is in a strong position to turn down orders for special material and special designs. It has required great courage at times to make decisions which would clear the involved manufacturing situation. Sales effort has had to be curtailed and good salesmen diverted from their regular work to go scouting for raw materials and for labor to man the shops. But now the lines of supply of materials have become better established, and production is going forward at a rate probably never before approached by the manufacturers in the electrical industry.

In setting down the reasons which caused and sustained the highly involved manufacturing conditions of 1916, lack of labor should be put first, and lack of raw material second. Capital for carrying on the work was not lacking, and the freight problem was a natural sequel to the labor and material shortage.

Consider the labor situation first. All the industries of the country are busy, and raw material producers are sold so far ahead that they have little concern about next year's market conditions. They need men. Nearly 500,000 men are engaged in munition supply work. And, in consequence of labor shortage and high living costs, wages for day labor have exceeded all previous limits.

The steel and textile industries, two of the greatest employers of labor, have granted a 10 per cent increase in wages for the third time since Jan. 1, 1916. Wage advances in many lines of manufacturing have been more than 50 per cent. Yet, notwithstanding the abnormally high wages paid, it has been practically impossible for manufacturers to hire all the men needed during the past seven or eight months. The reason for this has largely been the competition for labor among

the manufacturers. This is particularly true with regard to the high grade skilled employees and the low grade common laborers, the two extremes. And the natural consequence of this shortage of labor has been one of lower efficiency in the manufacturing operations. Men by the thousands, who two years ago had never seen the inside of a large machine shop, are now employed at machine work and drawing the pay of first-class machinists. Many a "skilled mechanic" of to-day never served an apprenticeship. Labor never cost so much and earned so little.

The material problem of the manufacturer can probably best be expressed to the railway reader by the statement that during the last year so far as embarrassment from slow delivery of material has been concerned, the manufacturer has suffered more than the railway. Most manufacturers at the beginning of 1916 had on hand some surplus stocks, supplies or extra parts ready for manufacturing their products. Many had built up reserve stocks during the lean years. They were thus able to sell to the roads and protect them against emergencies. In contrast, however, the manufacturer found his avenues for buying even more restricted. The producers had little surplus stock on which to draw and were inclined to listen only to the big buyers.

Manufacturers have put enormous pressure on the producers of raw materials and have gone to the extra expense of having materials expressed into their factories in order to be in position to accelerate deliveries of finished products to the railways. Raw materials must be paid for now at top-notch prices, and these conditions have existed for several months.

The Metal Market Is Still Unsettled

In the manufacture of electric railway materials copper plays a most important part, and the dearth of this material and its steadily rising price has been a bugaboo for many manufacturers. Since 1908 copper had ranged from 11 to 22 cents, until 1916 when it began its phenomenal climb. At the opening of the year 1916, the New York carload price for Lake copper was 20 cents per pound, and an epoch in the history of copper prices developed on Nov. 20, when for the first time all deliveries up to one year were quoted at 30 cents per pound or more. Bulk copper was then 34 cents. It should be remembered that the prices for lead, tin and zinc have followed the same general trend as those of copper, but toward the end of the year these materials were not quite so strong as was copper.

The copper question, so far as the manufacturer in the electric railway industry is concerned, is a delicate one. Should he stock up with copper at 35 to 40 cents per pound and use this to manufacture his devices for sale two or three months hence? Or should he buy just sufficient copper to fill existing orders and take chances on the future? In either case he is speculating—in one case with materials and in the other case with his prestige with his customers. There still exists a wide divergence of opinion as to the future trend of copper prices. Thus the manufacturer must busy himself with matching prices and widely fluctuating material costs in an endeavor to obtain for himself a margin of profit. From the railroad standpoint, of course, purchasing of copper and copper products at present prices means a largely increased permanent investment, on which there is a possibility of considerable drop. Hence the restraint in buying except for maintenance requirements.

What has been said about copper also applies very closely to the conditions in the steel and iron market, and uncertainty regarding steel prices and deliveries has caused the manufacturer no end of worry during 1916. The girder-rail manufacturers early in the year gave their old customers opportunity to buy their regular requirements. Having done this, the manufacturers felt themselves free to contract for all their other capacity. Electric railways purchased less girder rail in 1916 than for many years previous, except 1915. Even at these increased prices there is little prospect of very much girder rail being available for purchasers during 1917.

Buying Irregular But Market Conditions Better

Notwithstanding the present orders in hand and in prospect, market conditions in the electric railway industry are not as satisfactory as the manufacturers might desire. The general buying is extremely irregular. This no doubt is due to the fact that the field has largely ceased to expand. Comparatively little new street or interurban line has been built in the last five years. The average additional trackage growth per state is less than 15 miles per year, and that means that buying for the industry is based largely on maintenance and renewal requirements.

In turn, of course, this has benefited those manufacturers who are interested in other fields and yet are strongly entrenched in this one. It means that they are not now subject to the hazardous competition of earlier years. Then, when things were going fast, there was a market which stimulated competition by the very reason of its activity. New devices, new tools and new labor and money-saving methods were promoted in large numbers. But of late the field has not offered the inspiration for new things that it did in earlier years. Consequently most manufacturers have built up interests in allied fields of industry, and their problems have become those of production and sale of recognized products, rather than of design and development. This is tending toward standardization, and if the roads will adopt standards and buy accordingly, the saving to them will no doubt offset the loss due to the lack of the former highly competitive selling stimulus.

The manufacturers of cars, motors, trucks, rails and other large elements of an electric railway would extend every co-operation to any group or association that would standardize its requirements. Much has already been said on this subject. The manufacturers have always been ready to act, but even though associations have "adopted" standards, the railroads don't accept them for purchase. Standardization is a manu-

facturer's problem which the roads have a primary interest in solving at once.

The possibilities for next year's business are now a live topic. Prospects seem very bright just now for a busy year. Slack buying for four years, increasing traffic and much equipment that has outlived its natural life, would seem to warrant the prediction that the electric roads during 1917 will require more new materials and supplies than they have bought during several years past.

Developing Traffic

A new order of things presents itself in practically every phase of the electric railway industry as compared with practices, opportunities, restrictions, liabilities and public sentiment prevalent ten, five, and even two years ago. In the character of traffic and the possibilities of its development, especially, has there been noticeable change. For instance, the interurban service which we now assume as a potent factor of the whole transportation scheme of the nation has been almost wholly a unique factor in the field of electric common carriers. They had to create a field for themselves and carry people who previously did not travel. Now, however, this pioneer work is largely completed, use of the electric railways has become habitual, and there is not great room for expansion in this class of transportation, future growth of passenger travel being largely dependent on population growth. Yet this approach to saturation is what was expected in the original estimates as the means of profitable return to the investors, and the reason that the railways are now in hard straits is because the greatly increased operating costs were not anticipated.

Herein, then, lies the incentive and the necessity to go beyond the plans of the original promoters and include in the business of the electric lines, transportation which will offset the grossly enlarged operating costs, bring the lucrative return which was expected and is on the majority of roads impossible from the passenger business alone, and present a field where real endeavor may show big increases in total traffic and net profit.

As the various railways recognize this necessity to broaden the scope of their business, the immediate possibility for expansion in the transportation of freight is obvious. One prominent official even goes so far as to say that there is no electric line which accepts freight that does not have more traffic offered to it than it can possibly handle. We have repeatedly pointed out during several years past that the possibilities for important revenue from freight service were great, that the physical inadequacies were the principal limitations and that this was the answer to the question of future growth.

Hence, it is with interest that we see each year a few more properties engaging in this business. Thus, during the past year, to mention a few: the Terre Haute, Indianapolis & Eastern Traction Company; the Chicago, Lake Shore & South Bend Railway; the Cleveland, Southwestern & Columbus Railway, the Scioto Valley Traction Company and the Chicago, North Shore & Milwaukee Railroad, among others, have begun physical preparations for entering into the freight business in a large way. The Illinois Traction System, the Detroit United Railway, the Michigan Railway, the Pacific Electric Railway and others, already well established in this class of traffic, are making extensive additions to their facilities for handling carload and less-than-carload freight, including terminal facilities costing amounts approaching millions on individual properties. And so the dawn of another day in the traction field is bright.

Means to Encourage Car Load Freight

Ways and means to create freight traffic, once it is begun, are numerous, but much depends on the personal element in the straight solicitation of business, for much educational work is still necessary to show the shippers that the electric line really has advantages to offer. Hence, the solicitation must be tactful and convincing. Then the matter of service—fast, frequent, reliable schedules—is the foremost requisite for development of any class of traffic, and too much emphasis cannot be given to this consideration. Terminal facilities with arrangement and capacity for releasing teams and trucks with minimum delay are important business getters, for a merchant or manufacturer would much rather send his freight over a line that will get his team or truck away from the terminal without standing in line two or three hours than to use any line where he must make this expensive sacrifice. For every four trucks or teams that have to stand in idleness for two hours a day regularly, he must add another unit to his haulage equipment, with the added labor, upkeep and overhead it entails. This is a big item that the shipper sees and feels, and the road that can save him time and money here has a big advantage in attracting his patronage.

The carload freight traffic is coupled very closely in its possibilities with the interchange arrangements with other lines. Some difficulty is experienced in securing these traffic agreements with the steam lines, but this is gradually being overcome and must soon give way before the importance the electric lines can assume as tributaries to the flow of freight on the long haul lines. Following these arrangements, industries must be developed on the electric lines. Grain elevators are one of the common adjuncts in this connection. One merchant who was induced to build three elevators on a mid-western line has also put in large stocks of lumber, building material and coal at these points. The advantage of this combination is very significant. It not only permits all-year business for both the merchant and the railway, but makes it possible for the latter to handle cars under load both ways.

It is possible to develop some remunerative carload traffic by encouraging the installation of side tracks for lumber and coal yards at points adjacent to thickly settled communities. Connection with sand pits, cinder pits, stone quarries, etc., for distribution of their products, and unloading these materials at points close to the work under way with a charge for the actual cost of this unloading, will encourage preferential movements over electric lines. Attention to the hauling of brick, paving blocks and sand and cement for paving roads and city streets, especially where solicitation can include the ability to deliver close to the spot they are to be used, will create a goodly traffic in the course of a year. Keeping closely in touch with contemplated public and private improvements in towns along the line and co-operating with the concerns selling the materials necessary for this work will bring good returns. In fact, it is possible to make the railway traffic department a sort of information bureau for people located along the line, to direct as to the best place to secure almost all kinds of commodities. This is profitable when it stimulates shipments of carload lots or even steady shipments of less than carload quantities.

In many localities within 100 miles of our numerous sugar factories, beet culture is a profitable industry for the railways and the farmers. Beet dumps or receiving stations may be secured at the expense of the sugar company where, within a radius of 3 or 4 miles, farmers have 500 acres of beets, raise beets averaging 14 tons to the acre and haul them to the receiving station. At these stations the sugar company takes the beets, furnishes scales for weighing and pays the freight to the sugar factory.

Possibilities in Less-Than-Carload Freight

In the development of the less-than-carload and package freight traffic, the growth is more than ever dependent on "better service" and will increase almost in proportion to the class of service maintained. Some electric railways are making a practice of accepting shipments up to fifteen minutes before scheduled departure of trains, and by use of the Manibill system, make four copies of the waybills at once and place the destination station in a position to effect delivery in a few minutes after the arrival of trains. A liberal policy in discharging freight at points along the line where there are no depots is also a business producer for the distributor and a time saver for the receiver, and it makes friends for the company. These and other efforts at highest service are effective in competing with the motor truck, which is now offering keen competition for the short haul package freight. It is advisable in some cases to utilize motor trucks as feeders for the railway and to make street address deliveries in restricted areas where competition is particularly keen.

Working in conjunction with Chambers of Commerce and civic organizations for the development of truck farms and dairies, arranging convenient schedules for movement of these supplies to market, and co-operating to create a market, will often bring a very profitable return in traffic, though opposition from the commission men is often encountered. Another plan is direct co-operation with creameries and merchants along the line. One creamery company on a western road has for next year a plan of loaning money at a nominal rate of interest to any farmer who will invest it in milch cows, a plan which has great possibilities. In the handling of milk, of course, good results have been obtained by providing special milk trains.

Another very important field of traffic in which the rapid service of the electric line may be made an important inducement is in handling perishable freight. Meat, berries and other high class shipments, which otherwise move under ice, may be handled without icing by virtue of prompt service, thus saving the expense of icing to the shipper and to the road.

Then there is the carrying of freight on passenger cars, or "traction express" as it is often misnamed, an important item in the sum total business on the interurban line. Advantage is not taken of this plan by a great many roads, which seems rather surprising, for we are familiar with the income which has been realized from this source on several roads with practically no additional expense to handle the business and little solicitation to get it. It is a real service to the small town merchant to be able to telephone in early in the morning to his wholesale house 20 or 30 miles away and give his order for merchandise to be placed on the "8 o'clock car" and receive it at 9 o'clock.

Freight Franchises of Benefit to Public

Of course, many of the possibilities for expansion of the interurban freight service depend on the attitude of the municipalities through which the lines pass. Unfortunately there has been a short-sighted prejudice thrown around the handling of freight through the city streets, but this limitation is gradually lifting. The electric lines could bring about a large saving in the cost to the consumer of bringing produce, dairy products, etc., into the cities and moving building materials and freight generally, over the city streets to their point of local distribution or ultimate consumption. This movement could be made at night when the aesthetic sense of the citizens need be little disturbed, in tight, clean cars which would be much less obnoxious in every sense than the garbage and other filthy loads which are now hauled through our streets in the day time in leaky, unsightly wagons. Then, too, the matter of street congestion is assuming constantly greater importance, yet the most efficient means of transportation is used scarcely at all during one-fourth of the time. We are glad to note, however, that there is evidence here and there of a change in public sentiment as communities realize the savings and advantages secured by the movement of electric freight through the streets. And with the present high living cost, the savings in particular take on added public interest. Hence, this may be the opportune year for electric railways to press their case for freight franchise rights through the streets. Certainly no more commendable effort from the viewpoint of service to the community or profit to the company, could be made.

The Technique of Publicity

By Ivy L. Lee

Frankness in Dealing with the Public Through the Newspapers, Faith in Its Fairness if Facts Are Presented Simply and Truthfully, as Well as Methods for Securing Publicity Are Advocated in This Article.

PUBLICITY in the running of public service corporations is as important in its way as motive power itself. Electric railway managers have not had time to think about publicity. They are busy men. Their whole aim has been to please both the public and investors.

Years ago street railway managers were busy running their cars with horses and mules. That was a big problem in its time, and it was just as hard then—if not indeed harder—to satisfy both the public and investors. Then came a new and vital adjunct to the running of street railways—electricity. Railway managers had not thought much about its use to them. It came as something from the outside, but it came with a universal demand for its use.

The railway managers could not ignore this new force. First they employed experts to assist in adapting this new power to their service; then they made a careful study of it themselves. True, they were very busy, but this new thing was too important to leave to subordinates. Upon its successful use depended the whole future of the business.

Running railway properties to-day without taking the public into one's confidence, without using every legitimate means of publicity, is about as obsolete as operating street railways with horses and mules. Through publicity the railway manager of to-day brings to his aid those vital forces which come from support of the public. Without these, indeed, the business itself cannot live.

Taking the Public Into One's Confidence

Why is this thing, "Publicity," so important? It is so intangible and the direct value of it is so difficult to appraise that the practical mind is prone to regard it as an evanescent product of an age of newspaper hysterics, and not as a supremely vital and substantial force in business management. But even the most unimaginative business man has come to realize the power of public opinion. The public not only has power, but it has come to know that it has it. Public service corporations are beset on every side by laws and regulations. These, indeed, are very real things demanded by a democracy which refuses to be denied.

I am one of those who believe that the American people are fair; and that when they really understand the facts, they will see to it that justice is done. They have no objections to success as such, no matter how large, if only it is honestly and fairly attained. If this is correct, and if the railway manager feels that the ultimate success of his business hangs upon the fairness and justness of law and regulation, must we not see to it that the public which is back of law and regulation knows all the facts so that its judgments may be sound and constructive?

Not All the Fault Is With the Politicians

One so often hears it said that politicians are at the bottom of all our troubles; that if they would only stop their meddling all would be well. Those who make



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such a statement mistake the effect for the cause. The demogoggery of politicians is not solely responsible for the troubles of public service corporations. The misunderstandings of the public, due generally to lack of information on the facts or full information on a bad state of things, have led to an attitude of mind exceedingly open to the influence of the politician.

When public service corporations are run with primary regard for their public obligations, and when they have made the public know that this is true, the politicians will be prompt to trim their sails to other winds.

"Yes," you may say, "this is all very well, but let's get down to a practical basis. How does this all apply to the daily life of my company? What can I do to avail myself of this new power that in modern days, you say, is just as important as electricity itself in the conduct of my business?"

The Wrong Way of Dealing With Newspapers

The most important medium through which to deal with the public is the press. Newspapers are more delicately adjusted to sense the feeling of the people than any other institution. H. G. Wells says that the newspapers are the windows through which we look at the world. The street railroad man must, therefore, take the newspapers into his confidence, not as newspapers, but as representing the public which the newspapers inform.

Many people believe that successful publicity consists in the cultivation of pleasant personal relations with newspaper writers, and that if "the newspaper boys" are made to feel good all will be well. Such a theory is fundamentally unsound.

Of course, every man, be he newspaper man or otherwise, should be treated with courtesy, and the newspaper man should receive all facilities for obtaining facts to which the public is entitled. But to rely upon friendly interpretation of one's acts in any large way by the newspapers simply because of one's personal friendship is just as false a procedure as to seek a favorable judgment from a court because of one's pleasant personal relations with the judge.

A newspaper which bestows favors because of the personal friendships of its writers is sure to lose its influence; and a corporation which does not look beyond the newspaper and direct its policy with reference to satisfying that paper's readers is sure to be disappointed.

When and How to Use Publicity

Publicity is of no use whatever, unless the fundamental policy of the company itself is honest and sincere. Even if a company's policy is honest and sincere, it must not be taken for granted that the people fully

realize its character. Publicity for that policy is absolutely necessary.

People are thinking of their own affairs, and if a company's service is fairly satisfactory they are not likely to give it much thought until trouble arises. Then they think not so much of the generally good service as of the trouble. That becomes magnified. Continuous publicity of good work would have softened a public irritation in the day of trouble.

No public service corporation can satisfy everybody. The majority of people are indeed fair, but there are always some who consider that a public service company should be run for their particular benefit, instead of for the greatest good of the greatest number. In order that the criticism of such people be not given undue weight it is important that a company keep the public informed day by day and make itself understood.

The functions of a publicity man are not to "hush things up," and "put things over," but to interpret his company to an enlightened public opinion and to interpret an enlightened public opinion to his company.

In this era of a tremendous outpouring of literature of all kinds the man or company who can arouse curiosity has made a real step forward.

A central bureau of advice on public relations would serve as a power house of publicity assistance, but the local company must always turn on the power.

THE VALUE OF A PUBLICITY ENGINEER

Every company which can do so should employ a publicity engineer—preferably an experienced newspaper man—to advise with its officers and to act with them in all matters of public relationship and in the cultivation of general good will. Such a man should know what the public is interested in. There are many facts in the operation of public service corporations which are interesting and important. If the local newspapers knew about them they would gladly send members of their staff to get material for their columns.

The publicity man will know what the newspapers would send for if only they had the suggestion. He will write the matter the way the papers want it. In cases of accidents such a man is promptly on hand to see that the newspapers get those facts which the public is properly entitled to.

Of course, no one wants to co-operate with the "ambulance chaser," and neither the newspapers nor the public have any great interest in trivial accidents, however regrettable they may be from the point-of-view of the victims. On the other hand nothing irritates either the newspapers or the public more, when a serious accident occurs, than trouble in getting accurate information promptly.

This adviser in public relations—for such a man should be far more than a mere publicity agent—should constantly study the temper of the public mind. He should know criticisms of his company which are being made; he should know of improvements to its service which a company might effect with popular approval.

Some people seem to think that the functions of a publicity man are to "hush things up," and to "put things over." On the contrary, his work, in a word, will be to interpret his company to an enlightened public opinion and to interpret an enlightened public opinion to his company.

WRITE IN LANGUAGE THAT ALL CAN UNDERSTAND

It so often happens that when in matters of policy it is desired to make a statement to the local public the railway manager thinks it the wise thing to have a lawyer prepare the document. That is another fundamental mistake. Lawyer's functions are with the courts and commissions, in the conduct of negotiations, in the preparation of contracts, and in other purely legal activities.

When the man of legalistic mind attempts to speak to the public he usually encumbers his utterances with a mass of irrelevant facts or unintelligible jargon which makes the whole document vague and unreadable to the average man.

In the preparation of statements to the public, directness and terseness, even colloquialism, are of the utmost importance. The reason Billy Sunday is so effective is because he speaks the language of the people. The clergyman in the gown may use more elegant English, but if his real purpose is to reach the heart of man, he must realize how infinitely more effective is the homely straightforwardness of Billy Sunday.

Therefore, let the railroad manager accept the counsel of his adviser in public relations in the preparation of statements to the public, whether they concern either matters of routine operation or corporate policy—that is, assuming that he wants the people to know exactly what he means.

STAND BACK OF EVERY STATEMENT

And right here let it be urged that every statement from a public service corporation should be authoritative, issued preferably on stationery bearing the name of the company and the name of the president. Every newspaper, in fact every person, receiving such a statement should know whence it comes and who stands sponsor for it.

Nothing is more futile than any devious or indirect method of publicity. It may be that a company can at times induce the newspaper to publish as its own something which the corporation wants to have said. But unless the statement is in every detail truthful and embodies the honest policy of the newspaper itself no such effort on the part of a corporation can be successful. This leads to a discussion of advertising.

A public service corporation should take all of the advertising space it can afford to pay for. It should constantly inform the local public concerning its policy and daily work. Unless these are matters of current moment a newspaper cannot regard them as news. But it is none the less important that the public be constantly informed concerning them.

One of the greatest merchants in the world is H. Gordon Selfridge, an American, who runs a large department store in London. Mr. Selfridge has a big advertisement in the London morning papers every day telling of his prices, bargains and other strictly mercantile data.

SELFRIDGE TELLS ALSO OF HIS POLICIES AND IDEALS

But in the afternoon papers he pays for a column of space in which to tell of the general policies, the ideals, the principles of the House of Selfridge.

I question very much whether this advertisement in the afternoon papers does not contribute vastly more, in the long run, to the success of the firm than the purely commercial advertising. It is human nature for people to do business with those whom they trust, those in whose ideals they believe. Such advertising of one's ideals creates just that atmosphere of confidence.

It follows that, if a railroad corporation wishes the extension of a franchise, if it seeks relief from burden-

> "EVERY company which can do so should employ a publicity engineer—preferably an experienced newspaper man—to advise with its officers and to act with them in all matters of public relationship and in the cultivation of general goodwill. Such a man should know what the public is interested in. There are many facts in the operation of public service corporations which are interesting and important. * * *
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> "The publicity man will know what the newspapers would send for if only they had the suggestion. He will write the matter the way the papers want it."—Ivy L. Lee.

some taxation, or if it appeals for public support in any controversy, its appeals will fall upon receptive or deaf ears just in the proportion that the company enjoys the confidence, the real confidence, of the people whom it serves. And this confidence will be based upon actual observation of its service and such interpretation of its service as the company may, by appropriate publicity, truthfully make.

Experience has proved that the quickest way to get the company's story to the greatest number of readers is through advertising columns, where the company can write its own headlines and use type in the way best calculated to claim attention.

Other Opportunities for Publicity

Newspapers are not the only media of communicating with the public. Every railroad corporation has in its stations and cars an opportunity to create a medium of communication of its own, through cards and posters. Car cards are read first because they are short; and second because people cannot help seeing them. As in a movie theater, so here there is only one thing to look at.

Every electric railway company should avail itself of this medium to the umost. To do so it is necessary to make the cards interesting, make them pertinent, make them newsy. They should never be allowed to become an old story. Such cards should be appropriately illustrated, if possible, but they should most certainly be changed frequently.

But neither the newspapers nor the car cards can convey to all constituents of a company all of the data which people should have in order to interpret the company's acts. Those companies which have tried it have found it profitable to issue publications of their own. Such publications arouse the interest of employees; they form the basis for information for editorial comment by newspapers; they are media of communication with city officials, taxpayers' organizations and the like.

Such publications should be brief, very brief. My own experience has shown that it is much better to issue such publications irregularly—only when one has something important to say—rather than at stated intervals.

If issued at irregular intervals, those receiving such a publication are likely to wonder as to the occasion for its issuance at the time. It arouses curiosity. And in this era of a tremendous outpouring of literature of all kinds, the man or the company who can arouse curiosity has made a real step forward.

Arouse Curiosity First

Someone has said that advertising is the roadway to a man's mind. The way to make people read advertisements is first to arouse curiosity.

Both the railway manager and his adviser in public relations should give unusual attention to public bodies of all kinds, not with a view to exerting any but proper influences, but with a view to insuring that the members of such bodies are well informed concerning the policies of the company.

If the head of the company or if his adviser in public relations is a good speaker, the company has an exceptionally valuable asset. The community always likes to hear at first hand of the affairs of its public service corporations.

What a Central Bureau Can Do

The problem of the public service corporation will have to be solved separately according to the conditions in each local community. Especially is this true of electric railways. Any effective bureau of publicity to conduct wholesale the public relations of all electric railway companies is an impossibility.

But the fact remains that there are certain general problems which do concern all electric railways. Of these, the problem most fundamental is that of the fixed five-cent fare and its relation to the fact that the costs of operation and the amount of service expected for that fare are constantly increasing.

A central bureau can be of tremendous use in making a study of the service given for five cents in different cities and the conditions surrounding that service, and in supplying the results of the study to each company for interpretation and comparison.

The jitney problem concerns nearly all companies. The way it is being met in different communities and the methods used to cultivate sound public opinion with reference to it could very well be studied by a central bureau and the results placed at the disposal of each company for use.

So with reference to questions of paving, taxation, franchise permits, and service requirements by regulating commissions—all of these questions are of universal interest.

Likewise, local problems are constantly arising in the affairs of every company, concerning which information of the experience of other companies can be furnished by a central organization.

The American Electric Railway Association is an admirable organization for this. Under the direction of its committee on social relations a bureau could be created to be placed in contact with companies throughout the country needing its help.

Actual Things A Public Relations Bureau Could Well Do

Such a bureau could give specific advice to railway companies in connection with the establishment of publicity departments, and criticism and suggestions could be given concerning material to be issued to local communities. Publications could be edited on the basis of material supplied by the companies; car cards could be prepared, and other matters could be handled for use in each community concerning such problems as all companies have to meet.

Such a central bureau should work entirely through local companies and should not assume itself to conduct any campaign of education with reference to the general problems. Any effort, however, to avoid treatment of local problems by the local company is likely to prove wasted.

A central bureau of advice on public relations as outlined would serve as a sort of power house of publicity assistance, to which the wires of any company could be attached at will. But the local company must always turn on the power, and guide the machine.

Advertising the Twin City Lines

By A. W. Warnock

General Passenger Agent Twin City Lines, Minneapolis and St. Paul

AN ANALYSIS *of the Policies Behind the Publicity of the Minneapolis and St. Paul Companies—Some Examples of Advertisements Produced to Inform the Public of Causes of Delays and Changes in Routes.*

NOT so many years ago street railway companies generally took little or no interest in the broad subject of Publicity—a term we seem to have substituted to-day for the good old-fashioned word Advertising. True, we were always glad to have the press speak well of us if it felt so disposed, and conversely we were always pained to hear ill things said of us. Aside from an occasional paid "story" of our properties on some special occasion, however, no company really and truly adopted advertising as a strong aid to its success. It is to be doubted, indeed, whether we ever spent any money in advertising except under duress or protest—never, I suppose, because it was the sensible, business-like thing to do so.

The past ten years have seen street railway companies everywhere undertake practical, continuous advertising campaigns, and from the good widespreading results that we all know have followed, it is now a foregone conclusion that the day has gone when the right of advertising to a permanent place on the payroll of every progressive company will be questioned.

Great care should be employed in the management of a street railway company's advertising expenditures. In a day of "pitiless publicity" when every business,



profession and calling seems to employ a press agent who is screaming at the top of his voice, and when puffs and notices are seen so frequently in the columns of our papers delicately extolling the merits of men, wine, women, songs and other commodities, perhaps we might give pause and see that our advertising is properly done, so that it may ring true and make the proper impression on the reader.

There is danger, a great danger, that lack of care in such endeavor may work greater harm than good for us, and pessimistically we may ask ourselves the question, "Tell me, does it pay?" in the same way as the hopeless man shown in a recent cartoon which we reproduce herewith simply to show how very hopeless that is. This cartoon suggests the splendid series of publicity cartoons and talks which have been appearing in the ELECTRIC RAILWAY JOURNAL for some weeks past. Those talks and cartoons have expressed so clearly and aptly so many wholesome ideas on the subject that it is hoped the JOURNAL will republish them in some permanent form for their educational value to us all.



A. W. WARNOCK

THE ADVERTISING DEPARTMENT STARTED IN 1906

In view of the request of the ELECTRIC RAILWAY JOURNAL for an explanation of the simple working methods of the advertising policies of Twin City Lines, it may be of interest to say that exactly eleven years ago we organized an advertising department in connection with the General Passenger Department, and, like the patent-medicine testimonial, we can honestly say, "We wouldn't be without it in the house since buying our first bottle."

Prior to 1906, our company, like all electric or steam companies, was on the old-fashioned trading basis with the newspapers in our territory. We issued perhaps $8,000 worth of free tickets every year to the papers and carried their bundles of papers free, while they in turn gave us such "kindly mention" from time to time as they thought proper. The opening of a new extension, the purchase or building of some new cars, the installation of a new power house—these were all subjects for news stories regarding our property. One hand washed another, and the balance, if there was any, no matter in whose favor, automatically wiped itself out at the end of each year.

Just at this time the air all over the country was beginning to be surcharged with sentiment against free transportation of all kinds, and the days of the trading plan were numbered. In February, 1906, nearly one year before the Interstate Commerce Commission put a stop to the wholesale issuance of transportation in general and advertising transportation in particular, we put our relations with our newspapers on a strictly business basis—as much to their gratification and satisfaction as our own. All free transportation to newspapers was cancelled, and a charge of one-quarter cent a pound was made for the carriage of their bundles to local city points and one-half cent a pound to interurban points. Then it was we got down to a brass-tack basis of making definite advertising contracts for such space as we thought we needed. The papers thus received no favors from us, and we received none from them. I do not know whether newspapers in other cities are differently constituted than ours, but eleven years of such a business-like policy has taught us how just and fair the papers are in their attitude to a public service enterprise such as ours. If we are faulty in service, if we need reproof—in fine, if we are guilty of errors either of omission or commission, we hear from the papers promptly in big black type, to our discomfiture, perhaps. But if we do the decent thing by the communities we serve and give evidence of such purpose,

Best Way To See The Twin Cities

TWIN CITY LINES

Their Beautiful Lakes, Rivers, Parks and Interesting Public Institutions Most Quickly, Comfortably, Inexpensively

IS ON ELECTRIC CARS

You can obtain a good idea of Twin City geography and enjoy much interesting sightseeing, by traveling back and forth between Minneapolis and St. Paul on the four Interurban lines, each with its own distinctive attractions—the Minneapolis & St. Paul, the Como-Harriet, the Selby-Lake and the Snelling-Minnehaha. The fare from city to city is 10 cents, collected in fares of 5 cents in each city, entitling the passenger to transfer



at either end to any local line desired. Any point of interest can be reached from either Minneapolis or St. Paul as starting point. For instance, if you start from Minneapolis to Stillwater, go to St. Paul by any Interurban line and ask conductor for transfer to Stillwater. On return trip ask conductor on Stillwater Train for transfer to any Interurban line to Minneapolis.

MINNEAPOLIS TRIPS

WHERE TO GO	HOW TO GO	FARE
LAKE MINNETONKA. To see Lake Minnetonka most delightfully and economically get aboard a safe, swift, comfortable "Twin City" Steamboat. You can enjoy splendid trips of 1, 2, 3, 4 or 5 hours at a cost of from 20 to 50 cents by boarding Steamboats either at Excelsior or Wildhurst. Get a Lake Minnetonka Map Time Table for complete Steamboat information.	TO CONNECT WITH LAKE MINNETONKA FAST STEAMBOATS—Lake Minnetonka Cars leave 36th Street Station (17 N. 4th St.) for Excelsior every half hour from 6 A. M. until 6 P. M. Tonka Bay Cars leave for Wildhurst every hour from 6 A. M. until 6 P. M.	25c
THE CHAIN OF LAKES Park Board Launches leave Lake St. Landing for interesting pleasure cruises over the three beautiful urban bodies of water, LAKE CALHOUN, LAKE OF THE ISLES and CEDAR LAKE at 7, 8, 8:30, 9:30, 10, 11, 11:30 A. M., 12:30, 1, 2, 2:30, 3:15, 3:30, 4, 4:15, 4:45, 5, 5:30, 5:45, 6:15, 6:30, 7, 7:15, 7:45, 8, 8:30, 9:15, 9:30, 10, 10:15 P. M. Round Trip—11 Miles—90 Minutes—25 cents.	Take a St. Louis Park or Calhoun Beach Car to Lake Street Landing. Or take any Lake St. or Lake Harriet Car to Hennepin Ave. and Lake St. and walk along Lake St. a short distance to Lake St. Landing.	5c
CALHOUN BATHS AND BEACH Bathing under the finest possible conditions. Excellent refectory.	Take a St. Louis Park or Calhoun Beach Car.	5c
LAKE HARRIET Picnic grounds and boating. Excellent refectory. Evening band concerts on attractive roof garden. Park Board Launch leaves Main Dock at 8, 8:30, 9, 10, 11 A. M., 12, 1, 2, 3, 4, 4:30, 5, 5:30, 6, 6:30, 7, 7:30, 8, 8:30, 9, 9:30, 10, 10:30, 11, 11:30 P. M. Round Trip—2.5 Miles—25 Minutes—10 cents	Take a Lake Harriet, Oak & Harriet, Oak & Xerxes, Como-Harriet or Hopkins Car.	5c
MINNEHAHA FALLS AND PARK A great scenic playground of 142 acres, a delight to everybody. The immortal Falls and Glen, picnic grounds, flower gardens, deer, elk and bear reserve. Excellent refectory. **MINNESOTA SOLDIERS' HOME** Attractive buildings and grounds, with superb river views. **LONGFELLOW ZOO GARDENS** Trained and wild animals and birds.	Take a Minnehaha Falls or Snelling-Minnehaha Car.	5c
GLENWOOD PARK Picnic grounds, public golf links and bathing. A wonderful park of 586 acres.	Take a Glenwood Park Car.	5c
MINNESOTA STATE UNIVERSITY A group of splendid educational buildings adorning a splendid campus.	Take an Oak & Harriet, Como-Harriet, or St. Paul & Minneapolis Car.	5c
MINNESOTA STATE FARM A most interesting "Model Farm" well worth visiting.	Take a Como-Harriet Car from either Minneapolis or St. Paul. Same fare.	5c
MINNESOTA STATE FAIR A composite and pictorial exposition of the State's resources on Sept. 4, 5, 6, 7, 8, 9	Take a Como-Harriet or Fair Grounds Car from either Minneapolis or St. Paul. Same fare.	5c
FORT SNELLING Scenic, historic and picturesque.	Take a Snelling-Minnehaha Car from either Minneapolis or St. Paul. Same fare.	5c
MINNEAPOLIS ART MUSEUM An unusual collection of paintings, sculpture and art treasures. Open on Sundays and Mondays from 1 to 5 P. M. On other days from 10 A. M. to 5 P. M.	Take any Car on Marquette, Nicollet or 4th Ave. S. to 24th St. and walk along 24th St. & short distance to 3rd Ave. S.	5c
FLOUR MILLS AND FALLS Best seen from Tenth Avenue South Bridge.	Take a Car to Washington and 10th Aves. S.	5c
BEST MISSISSIPPI RIVER VIEWS	Take a Selby-Lake or Snelling-Minnehaha Car from either Minneapolis or St. Paul. Same fare.	5c

ST. PAUL TRIPS

CITY OF STILLWATER "Park City," on St. Croix River. Get a St. Paul and Stillwater Map Time Table for information about Stillwater, State Prison, Wildwood Park and White Bear Lake Resorts.	St. Paul & Stillwater Cars leave Seven Corners Terminal at 27 and 57 Minutes past each hour.	30c
MINNESOTA STATE PRISON "The Finest Prison in the World." Open every day except Sundays and Holidays from 8 to 11 A. M. and from 12:30 to 4:30 P. M.	Take a St. Paul & Stillwater Car from St. Paul and Transfer in Stillwater to a South Stillwater Car.	30c
WILDWOOD PARK On picturesque White Bear Lake. "The Twin Cities' Ideal Picnic Resort," offers fine restaurant, dancing, bathing, bowling, boating, picnic groves, playgrounds, roller coaster, water sports and other amusements. Sunday orchestral concerts.	Take a St. Paul & Stillwater, Hazel Park & Wildwood, Hazel Park & White Bear, or Hazel Park & Mahtomedi Car.	15c
WHITE BEAR TOWN	Take a Hazel Park & White Bear Car.	20c
COMO PARK AND COMO LAKE A glorious park of 425 acres of charming waterways, flower gardens, picnic grounds, woods, boulevards. Excellent refectory. Motor-bus trip around and through the park, 25 cents. Evening band concerts, except Mondays, in front of beautiful Casino.	Take a Como-Harriet or Como Park Car.	5c
HARRIET ISLAND PUBLIC BATHS A most attractive Municipal resort on the Mississippi River. Excellent refectory.	Take a Mississippi & Cherokee Heights or Jackson & Snyder Car.	5c
INDIAN MOUNDS PARK Offering wonderful wide-sweeping views of the Mississippi River.	Take a Rondo & Maria Car.	5c
MINNESOTA STATE CAPITOL One of the most magnificent public buildings in the world. Open every day except Sundays and Holidays from 9 A. M. to 5 P. M. On Saturdays from 9 A. M. to noon	Take a Car to Wabasha Street and Central Ave.	5c
ST. PAUL'S FAMOUS SUMMIT AVENUE Handsomest residential street in America.	Take a Car to Selby and Nina Aves.	5c
SOUTH ST. PAUL STOCKYARDS Fifth largest livestock market in the country.	Take a South St. Paul Car.	5c
PHALEN PARK AND LAKES An enchanting park of 165 acres of beautiful "Linked" waterways, picnic groves, woods, boulevards. Bathing and boating. Excellent refectory. Evening band concerts, except Mondays.	Take a Phalen Park Car.	5c

Send Your Address and 6 Cents in Stamps Today

For a Copy of the New Picture Map Folder "The Twin Cities—1916"

Handsomest booklet of information published about Minneapolis and St. Paul. Printed in four colors, on finest paper, in highest art. Tells how to see and enjoy all the above interesting places in and about Minneapolis's Two Great Cities. Contains new information and pictures as well as seven splendid colored maps of Twin City interest.

A. W. Warnock, General Passenger Agent. Telephones—Main 4580—Center 3134.

TWIN CITY ADVERTISING—THREE-COLUMN ADVERTISEMENT FOR "NEW BUSINESS"

we are backed up by the papers and given equal credit. Could anything be fairer?

We have six large daily newspapers in the Twin Cities and we treat them all exactly alike as to volume of space purchased. We play no favorites at any time or under any circumstances. Line for line, each paper receives exactly the same number each year. Our first contracts, made in 1906, were for 14,000 agate lines of space in each paper, and from time to time, as our necessities have required we have raised that amount, until our contracts for 1916 were for 42,000 agate lines for each paper. That is the principle followed for the large dailies. Such city weeklies as we use receive contracts based on their character, influence and circulation. In small towns and villages served by our interurban lines, we give each weekly paper the same amount of money for the insertion of a 5-in., single-column timetable advertisement for the entire year. Some of the small-town papers figure such a service at $10 or $15 less than is asked by the largest paper, but we believe that each paper in its own town is as important as any other, and so the general standard highest figure is adopted by us as the basis for all. A good, clean, well-edited weekly paper is a big asset for any little town, and should be treated liberally.

The space purchased, comes now the logical question what do we put into it?

KINDS OF ADVERTISEMENTS PUBLISHED

Strange as it may seem, we devote only a part, a very small part, of our space to what might be termed the solicitation of new business. From May 15 until Sept. 30 we operate a fleet of seven passenger and excursion steamboats on Lake Minnetonka in connection with our two interurban lines from Minneapolis, and that service offers material for limited exploitation for the short period of three months, June, July and August. From Memorial Day to Labor Day we also operate Wildwood Park, a resort on White Bear Lake, reached by another of our interurban lines from St. Paul, and some space is used for that. Of all our advertising efforts we can say honestly that we have found the best general advertisement to have been a three-column announcement, giving in table form the list of places of interest reached by our lines, a few words concerning each place, the cars to take to reach them and the rates of fare. During the summer season we constantly use such a standard bid for new traffic, and from the expressions of many strangers and home people alike, we believe it gives just the street-car information people want.

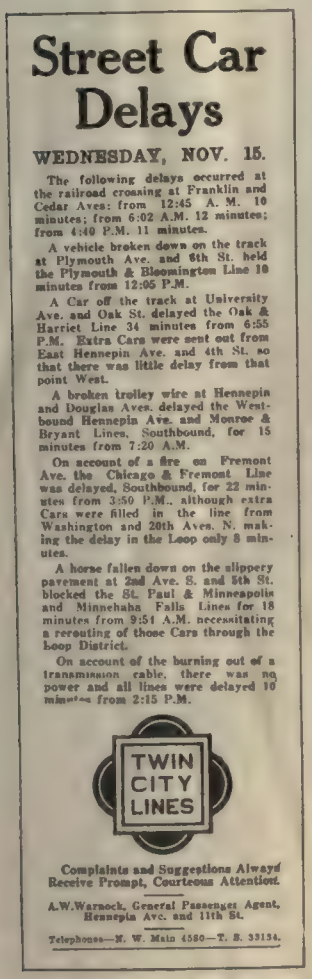
But the bulk of our contracted space, the large bulk, is used simply and primarily to keep the public of the communities we serve informed of our general service.

"Why was my car late coming along to take me to my work this morning?" "Why was I delayed getting home from my work last night?" "What is the reason for rerouting such a line?" "When will such a line be opened?" "What are my transfer privileges?" "What is the reason for this and that and the other thing?"

These are some of the many subjects we discuss in our announcements from time to time. Take the matter of delays. How exasperating it is never to know what delayed your car going to or from your work, to find your line rerouted arbitrarily without advance notice, not to be advised of new transfer privileges, or not given reasons for changes in service which you as a patron are justly entitled to receive!

For several years we have printed from day to day, as occasion requires, a Street Car Delay advertisement in all our daily papers. The purpose is to answer the many delay questions which naturally arise in the car patron's mind. A specimen advertisement is submitted.

No delay is announced unless it has been for ten minutes or more, and all delays, whether our own fault or that of others, are recorded. If defective equipment was the cause, we report it as readily as though some drayman's wagon broke down on our tracks, although we never mention the drayman's name. We do not say "The Peerless Draying Company's wagon, broken down on our track, delayed the Hennepin Ave. Line," but "A wagon broken down," etc. The fairness of such a rule is obvious. These delays are reported to our office by the general superintendent by 11 a. m. each day, and at 11:45 a. m. they are in six newspaper offices ready for afternoon editions. Thus the patron reads about the cause of his morning delay on his way home or at his fireside in the evening. We have received from our patrons literally hundreds of favorable comments on these announcements and can recommend such publicity highly to all companies. The announcements should be boiled down hard, and simply state facts—the facts the passenger wants to know. These advertisements will probably average each about 80 agate lines, single-column space. We have tried all sorts of typographical arrangements, but the sample submitted seems to fill the bill best of all and is a style we have followed for a long time. Good-sized, easily read type should be used in a generous space.



Street Car Delays

WEDNESDAY, NOV. 15.

The following delays occurred at the railroad crossing at Franklin and Cedar Aves: from 12:45 A. M. 10 minutes; from 6:02 A.M. 12 minutes; from 4:40 P.M. 11 minutes.

A vehicle broken down on the track at Plymouth Ave. and 6th St. held the Plymouth & Bloomington Line 10 minutes from 12:05 P.M.

A Car off the track at University Ave. and Oak St. delayed the Oak & Harriet Line 34 minutes from 6:55 P.M. Extra Cars were sent out from East Hennepin Ave. and 4th St. so that there was little delay from that point West.

A broken trolley wire at Hennepin and Douglas Aves. delayed the Westbound Hennepin Ave. and Monroe & Bryant Lines, Southbound, for 15 minutes from 7:20 A.M.

On account of a fire on Fremont Ave. the Chicago & Fremont Line was delayed, Southbound, for 22 minutes from 3:50 P.M., although extra Cars were filled in the line from Washington and 20th Aves. N. making the delay in the Loop only 8 minutes.

A horse fallen down on the slippery pavement at 2nd Ave. S. and 5th St. blocked the St. Paul & Minneapolis and Minnehaha Falls Lines for 18 minutes from 9:51 A.M. necessitating a rerouting of those Cars through the Loop District.

On account of the burning out of a transmission cable, there was no power and all lines were delayed 10 minutes from 2:15 P.M.

TWIN CITY LINES

Complaints and Suggestions Always Receive Prompt, Courteous Attention.

A.W.Warnock, General Passenger Agent, Hennepin Ave. and 11th St.

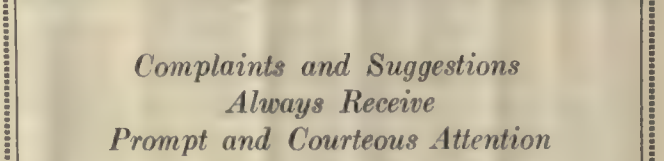
Telephones—N. W. Main 4580—T. S. 33134.

ADVERTISEMENT ANNOUNCING CAUSES OF DELAYS

Our advertisements covering new features of service usually occupy a space equivalent to three columns wide and 8 in. or 9 in. deep, about 350 to 400 agate lines. A liberal use of white space to make the advertisement attractive and a rather standard typographical style we have found to be two good rules. Perhaps the reproduction of some specimen announcements may give an idea as to the methods we employ in this respect. The importance of the announcement necessarily determines the size of the space used. We have taken as much as a "two-page spread" (two pages opposite each other) to tell of important work done or of several new lines to be opened. There was such a case two years ago, when we explained the amount of improvements undertaken during the unusually heavy summer season of 1914. The advertisement went into the details as to the building of 45.72 miles of new track in 1914, which meant 23.27 miles of new lines and 22.43 miles of old lines rebuilt, also 165,963 square yards of new paving laid and 100 new cars built, as well as all the news details of the opening of the new lines for service.

This information had a strong news value, and the newspapers would have been glad to have printed it at length, but we preferred to take a large amount of space to tell the story in our own way and at our own time. That naturally suggests the idea that we do not offer news stories to newspapers, unless we are asked to do so, or unless we know it is real out-and-out news such as they would ask for if they knew of its existence with us. City and managing editors have grown to look with cold eyes on the Greek bearing gifts in the guise of professional "press agents" with "hot news stories." Why should papers print anything about the building of your wonderful new smoke stack, or any of your other doings? If the smoke stack should fall down in the course of erection, that's news, but not otherwise. Be ready to give the news that is asked, and to tell the real damage the smoke stack did in falling. Nowadays, very properly, it seems to be bad form to work a willing press for free "puffs" and "send-offs." An over-enthusiastic, over-zealous press agent, measuring his results by the number of inches of free space he gets in the papers for "the pieces" he writes, is likely to be a dangerous person to have access to a public-service corporation's closest confidences. So much depends upon the horse sense of the man acting as the megaphone for your property!

It is regrettable that in too many companies in the past the idea of publicity was to tell only what the management wanted to tell, not what the public had a right to know and what it should have been told. There have been instances where it was the vogue to hand out a plate of carefully selected scraps of news at the back door to reporters, under the mistaken notion that the giver was bestowing priceless gifts on the receiver.



Complaints and Suggestions Always Receive Prompt and Courteous Attention

TWIN CITY ADVERTISING—SLOGAN PUT ON ALL ADVERTISEMENTS OF THE TWIN CITY LINES

Our papers like to print our monthly financial statement, and on the same day that such a statement is released in New York, copies are sent to all the papers in Minneapolis and St. Paul. Usually telephone inquiries from the papers follow the receipt of these statements, asking for the cause of the decrease or increase of earnings shown. Last month one city editor called us up and asked to what we attributed such heavy earnings for a month. We explained that it was because of the natural good times prevalent in the Twin Cities, everybody at work and so many folks riding. That was all right as far as it went, but he wanted further explanation.

"It's the same prosperity reason that accounts for the fact that your paper last night had 48 pages with 100 per cent more advertising at 25 per cent higher rates than a while ago when you had only 16 pages."

"I'm on," the editor laughingly replied. "I guess ours is a good deal better game than yours."

Reporters readily can see anybody they want to see in our offices, and if they prefer to see the president or any other officer than our publicity department they are always welcome. Doors leading to executive offices with "PRIVATE" in neat gilt letters fortunately are passing out of vogue. People with grievances or proper inquiries in their minds should not be met with rebuffs or obstacles at the start when they visit public servants —which we all are. Accessibility breeds friends. "WELCOME" looks decidedly better on a door than "No ADMITTANCE."

We have a slogan which we put at the bottom of every advertisement we print, whether a newspaper an-

nouncement, car window card or any other form of publicity. It is a true and tried friend, and we always try to back up the promise contained in it with kindly and cheerful performance on our part. This slogan is shown on page 21.

We have explained as fully as seems desirable our advertising as applied to newspapers. There are still some other forms of publicity we have used for some years with most satisfactory results.

Other Forms of Publicity

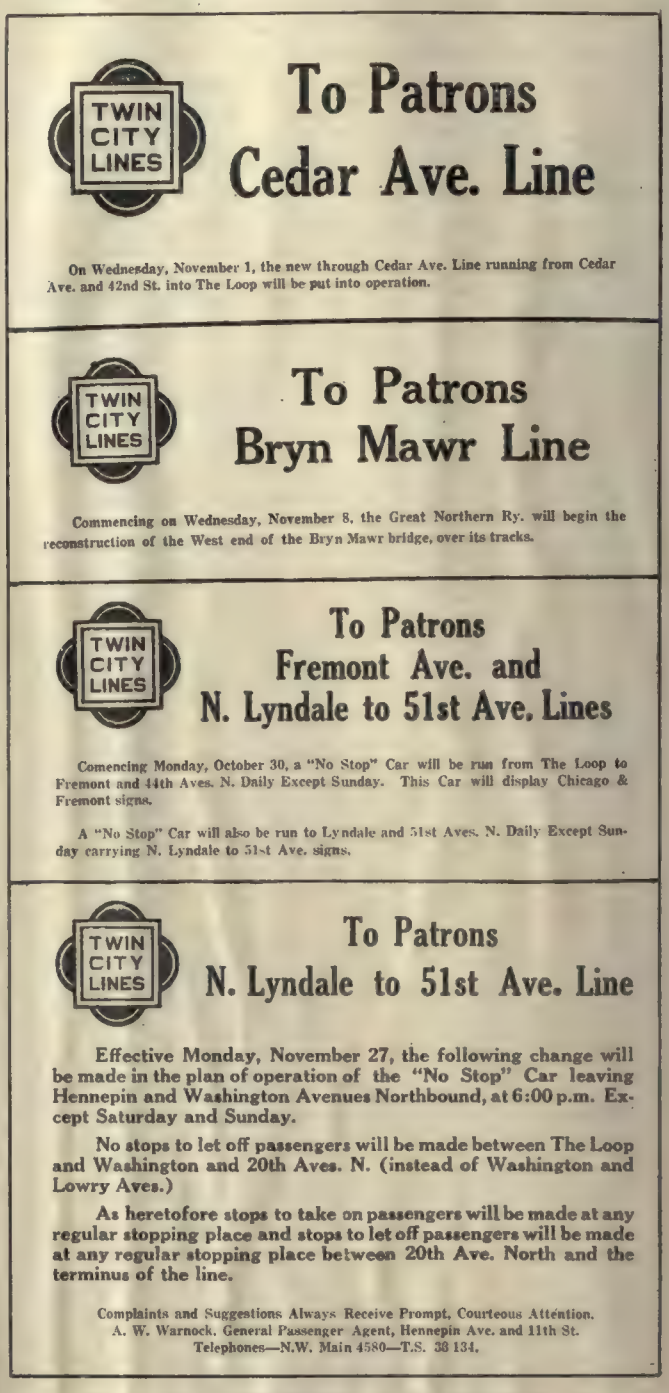
At an early date in 1917 we will issue our twelfth annual folder entitled, "The Twin Cities To-day." The purpose of this folder is primarily to exploit the Twin Cities and their attractive surroundings, and secondarily and indirectly to advertise the Twin City Lines and the service they offer. This folder has been an annual feature with this company, as stated, for eleven years, and it is issued in improved form each year, although the shape is never changed. The folder consists of 64 pages 4 in. x 9 in. when folded and opening up to 9 in. x 32 in., printed in four colors and illustrated with a large number of fine maps and halftones, on the best paper obtainable. This folder is offered in the daily papers in the Twin Cities and throughout the State of Minnesota and elsewhere in a small advertisement from May until September. A copy is mailed upon receipt of six cents in stamps, although it costs nearly double that amount. On the average, seventy-five letters requesting copies are received daily from all over the country from persons who intend to visit the Twin Cities for a vacation, to stop over on their way west, or to move to the Twin Cities to reside. The nine steam railroads running into the Twin Cities distribute this folder over the counters of their city ticket offices in the Twin Cities as well as in all their leading offices throughout America. It is not an uncommon experience to receive a letter from a man in New York or Chicago asking about the advantages of the Twin Cities before he starts on a journey to the Coast. This folder is also found in hotel time-table racks everywhere in the Twin Cities, and it is on all the passenger steamships plying between Duluth and Buffalo on the Great Lakes, as well as on the large river boats running on the Mississippi River between St. Paul and St. Louis. It is used in the Twin City schools as a text book for Twin City geography. Civic associations in Minneapolis and St. Paul use it as an aid in influencing desirable people to come to our cities to live.

This folder is also distributed in the information bureaus of all the large department stores in the Twin Cities, in the public libraries, and in all other places where strangers are likely to visit. The leading hotel of St. Paul and the leading hotel of Minneapolis make it a rule to put a folder in each room on the arrival of a new guest. The first thing that a guest to either of these hotels sees is one of the Twin City folders with its collection of street railway maps and information for his benefit. We got that pleasant idea from a hotel in Heidelburg, Germany.

Possibly the reason why the folder is acceptable in so many places is because of its character, for while we do not waste money on its preparation, nevertheless from a mechanical point of view, it is prepared with all the skill and taste that the best artists, mapmakers and printers can summon to their aid. It has been our constant aim to make it so distinctive as to be in a class by itself. The good these annual folders have done for us has been immeasurable.

Right here may we suggest that the reason why so much printed matter, regardless of how "clever" it may be, does not always do its greatest good, is because no intelligent carefully thought-out plan is drawn up and followed for its distribution. The best folder is worthless and really represents a waste of time, paper, ink and money unless it gets into the hands of prospective riders on your cars, the people you prepare the folder for and whom you want to reach.

We carry in two upper sash windows of all our cars two six-ply car cards, measuring 14 in. x 25 in., on



TWIN CITY ADVERTISING—ANNOUNCEMENT OF CHANGES IN ROUTES

which is displayed general information which we believe is most essential in following up our advertising satisfactorily. These cards carry constant daily invitations and reminders to passengers to bring their grievances to us for prompt attention.

The past year we have issued pocket time-tables of each of our local lines for the information of patrons. We do not show the time where the headway is very frequent during the rush hours, but practically all cars are shown from all terminals on all lines from midnight

to midnight. The signs and routes of each line are given, and altogether a patron with one of these time-tables in his pocket experiences a feeling of satisfaction in knowing just what service he has a right to expect on his line. We all know how patrons have the habit of writing for such information, and so we give it to them in neatly printed form. One folder gives the car signs and routes of all the lines of our system. How times have changed! Think of issuing a street railway time-table in the old horse-car days!

To make his advertising fulfill its mission and get results, whether the commodity he is offering be groceries, pianos or street-car service, the advertiser must do exactly what he says he will do and give exactly what he promises to give, tying up each transaction with those silken strings called courtesy and considerate service. A public-service corporation must make even greater efforts to back up its promises with civil, efficient performance. You must first believe absolutely —or, at least, most of it—is reasonable, and that good will on your part will beget good will on the public's part. You must stand ready and willing to do the right and reasonable thing at all times as well as to receive with an open mind any complaints and suggestions, whether they be reasonable or unreasonable. You should regard the receipt of such complaints as real opportunities to make friends and to remedy defects in your service, instead of taking offense thereat, as has unfortunately been the case too many times in the past. In that way you will earn and retain the good will of your public, and there will be no question about whether your advertising "pays."

Advertising, stripped to the bone, is simply telling your "store news" honestly, clearly and sincerely, and then making good on it. That means treating the customer well and satisfying him completely from the beginning to the end of his dealings with you. In short, it is the practical application of the Golden Rule. In recent years the "wiseheimers" in the advertising line have made much talk about "psychology," "appeal to the mind," and other vague and mysterious things, whereas really to any straight-thinking business person advertising should be as simple as the first three letters of the alphabet.

A Public Relations Department

By Frank Wert

Manager Public Relations Department, Mahoning & Shenango Railway & Light Company

THE PURPOSES OF *a Public Relations Department Are Explained by the Author, Also the Means Which Have Been Adopted for Improving the Relations Between the Company and Its Employees.*

THE Mahoning & Shenango Railway & Light Company of Youngstown, Ohio, has had a public relations department since Sept. 1, 1914, and we look upon its field as somewhat more comprehensive than a publicity department, as its scope includes a variety of activities all bearing upon the question of improving the relations of the company with the patrons. Some of these activities have been fairly well established, while others remain to be developed to their proper degree of usefulness. Prior to its organization, matters of publicity, advertising, complaints, etc., were cared for in departments whose other duties were too pressing for them always to give proper attention to these "side issues." Hence the department was organized and these matters placed under its jurisdiction, and other duties assigned to it from time to time as occasion arose.

The field covered by the department at present may be divided about as follows:

Publicity.—Supplying ten daily and several weekly newspapers with news facts about the company, its activities, accidents, etc., and in general affording a ready means for newspapers to obtain information and acting as the company's mouthpiece. All matters pertaining to the lay press, and largely to the technical press, are handled in or through this department.

Advertising.—Both commercial and "good-will." Comparatively little of the latter has been done, but opportunity is never lost to use the advertising columns of newspapers to announce and explain changes in schedules, routes, transfer privileges, fare collections, etc. More comprehensive use of newspaper space for "good-will" advertising is contemplated, the difficulty not being the subject matter for such advertisements, but rather the opportune time for establishing the precedent so as not to create the impression that the company



FRANK WERT

"wants something," and therefore is "trying to be good." All contracts for advertising and, in a general way, all copy, especially if it touches on any question of policy, are under the jurisdiction of this department.

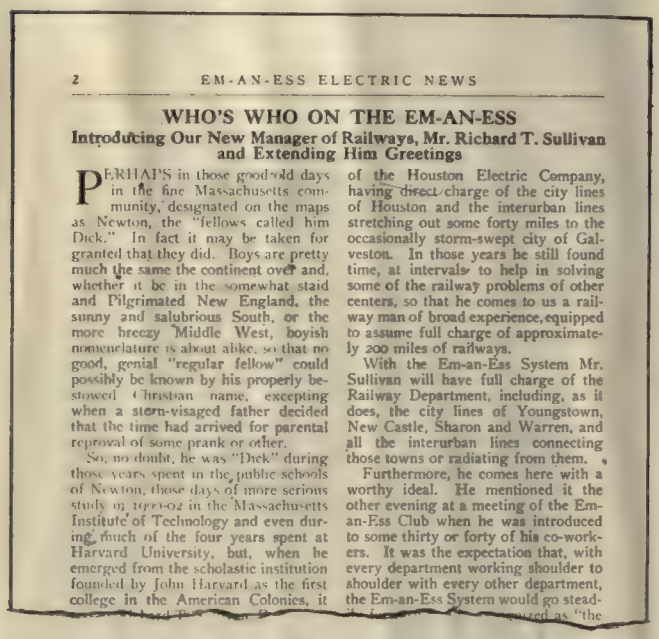
Bureau of Adjustments.—This is an adjunct to the department to which all patrons, railway or lighting, are invited to bring their grievances in order that the company may make reparation, may adjust or explain, as the case warrants. It is the medium through which the company seeks to meet the individual who feels that he has not been used fairly and to right speedily any wrong that exists. It is operated upon the basis that "the customer is right" until the contrary is proved, and that no matter complained of is too trivial for thorough investigation. This bureau has been in existence for one year and has handled more than 1500 cases. Many of these, of course, have been trivial, but some of them have disclosed conditions of operation which could be changed in such manner as to lead to the satisfaction of a large number of patrons who had not voiced their dissatisfaction. Very few absolute failures to satisfy the patron have resulted, though the number of those who remained resentful but silent cannot be estimated. Letters and personal expressions of satisfaction at the courtesy and fair dealing meted out by the bureau have been fairly numerous. Of course, the great bulk of complainants are never heard from, partly because their resentment vanishes after the first outburst

and partly because a complaint adjusted becomes to them a closed incident not calling for any comment.

This bureau also handles the refunding of excess fares dropped into fare boxes, calls concerning outage of street lamps and some commercial lighting "trouble calls," and shortly it will take over the restoration to owners of articles found on the cars.

House Organ.—The *Em-an-Ess Electric News*, a monthly paper, 6 in. x 9 in., twenty-four pages and cover, is issued under the editorial direction of the manager of public relations. A part of a sample page of this little periodical is shown in the illustration below which indicates also one of the ways in which the opportunity for introducing a newcomer in the company ranks to the mass of employees is embraced by the publicity department.

The *Em-and-Ess Electric News* is distributed free to every employee and to a small number of persons outside



2 EM-AN-ESS ELECTRIC NEWS

WHO'S WHO ON THE EM-AN-ESS

Introducing Our New Manager of Railways, Mr. Richard T. Sullivan and Extending Him Greetings

PERHAPS in those good old days in the fine Massachusetts community, designated on the maps as Newton, the "fellows called him Dick." In fact it may be taken for granted that they did. Boys are pretty much the same the continent over and, whether it be in the somewhat staid and Pilgrimated New England, the sunny and salubrious South, or the more breezy Middle West, boyish nomenclature is about alike, so that no good, genial "regular fellow" could possibly be known by his properly bestowed Christian name, excepting when a stern-visaged father decided that the time had arrived for parental reproval of some prank or other.

So, no doubt, he was "Dick" during those years spent in the public schools of Newton, those days of more serious study in 1900-02 in the Massachusetts Institute of Technology and even during much of the four years spent at Harvard University, but, when he emerged from the scholastic institution founded by John Harvard as the first college in the American Colonies, it

of the Houston Electric Company, having direct charge of the city lines of Houston and the interurban lines stretching out some forty miles to the occasionally storm-swept city of Galveston. In those years he still found time, at intervals, to help in solving some of the railway problems of other centers, so that he comes to us a railway man of broad experience, equipped to assume full charge of approximately 200 miles of railways.

With the Em-an-Ess System Mr. Sullivan will have full charge of the Railway Department, including, as it does, the city lines of Youngstown, New Castle, Sharon and Warren, and all the interurban lines connecting those towns or radiating from them.

Furthermore, he comes here with a worthy ideal. He mentioned it the other evening at a meeting of the Em-an-Ess Club when he was introduced to some thirty or forty of his co-workers. It was the expectation that, with every department working shoulder to shoulder with every other department, the Em-an-Ess System would go stead-

SAMPLE PAGE FROM "EM-AND-ESS ELECTRIC NEWS"

the company. Its purposes are especially to promote courtesy toward patrons, the practice of safety in operation and co-operation among the various divisions of employees and, in general, to place before all employees the problems involving electric railway and power companies with a view to the promotion of better relations with the public. That is to say, the company feels that by homeopathic doses of educational effort the large number of employees who actually come into touch with the riding and light-buying public may gradually be turned from a liability of unsympathetic ignorance concerning the company into a decided asset through:

1. A growing appreciation of what is due to patrons (courtesy).

2. Improvement in the service rendered, and therefore a removal of many causes of friction between company and public (safety and efficiency).

3. An intelligent understanding of some of the more outstanding problems of public utilities (paving burdens, excessive taxation, service requirements beyond the earning capacities of lines, etc.), so that the employees may become advocates of fair treatment of the companies instead of joining in the chorus of unthinking criticism.

To insure reading by the employees in general and to gain sympathetic interest for the publication, one-third to one-half of the paper is devoted to personal news from all departments. Considerable space is also devoted to articles on changes in personnel, improvements made by the company, new equipment, history of various departments, biographical sketches of old employees, etc., while the more important educational efforts are kept from being so conspicuous as to alienate the interest of the great body of employees. Too much preaching leads to resentment.

It has also appeared to us that a good means of accomplishing the purposes sought in the paper is to publish from time to time cartoons representative of some general idea upon which may be based an editorial article of instructive value. For this purpose we have utilized cartoons published in the Electric Railway Journal, and we hope to print other cartoons in the same manner, believing that cartoons are a powerful means of pointing a moral.

In the Councils of the Company.—Under the organization plan of the company the heads of the main departments, such as the railway, light and power, accounting, treasury and claims, form a sort of cabinet for the president, and meet regularly every two weeks to discuss company problems. The manager of public relations is a member of this "cabinet," and his "portfolio" is that of "advocate of the people." He is included in this group for two purposes:

1. So that he may be informed concerning all important developments, a necessity for publicity work, and

2. That he may present objections to any proposal which, from his observation, would seem to be objectionable to the people. Sometimes this may lead to a project being abandoned or postponed till conditions change. More often it leads to modification to meet the wishes of the public. Still more frequently it results in a discussion of a proposal from many viewpoints and the determination upon a plan for presentation to the people so as to reduce to a minimum their opposition by clearly showing to them the benefits to them as well as to the company.

For essentially the same reasons the manager of public relations is a member of or attends meetings of various departmental organizations, the object always being to keep him fully informed of developments in the company and to insure due consideration of the wishes and needs of the public on the part of all executive and operating officials.

Questions of donations to charities and various other incidental matters go to complete the "tour of duty" for the department, so that there are few activities of the company that do not touch to some extent or other the public relations work.

Essential Truths of Public Relations

In conclusion I might say that I have read with interest the publicity and public relations editorials published for some weeks past in the Electric Railway Journal, and consider them exceptionally forceful and thoughtful expositions of the truths which must be accepted sooner or later by all public utilities, namely:

That publicity is a necessary part of public utility work.

That publicity must be free and frank, never so slightly tinged by press agency, and must be constant, considerate and progressive, if suspicion and misunderstanding, due to the silence and, in some instances, "gum-shoe" political methods of former years, are to be replaced by confidence and appreciation.

That education is needed not solely by the public, but just as much by the rank and file of employees, and, perhaps, even more particularly by the executives, boards of directors and stockholders, whose financial interests are bound up in the welfare of utilities.

Publicity Pays

By W. T. Waters

Publicity Manager Georgia Railway & Power Company, Atlanta, Ga.

PUBLICITY *Is Broad and Far-Visioned Advertising and Can Be of Material Assistance in Every Just Cause—The Editorials in the* ELECTRIC RAILWAY JOURNAL *Point the Way.*

I WONDER how many street railway bondholders and stock owners and directors and executives read those recent editorials in the ELECTRIC RAILWAY JOURNAL on publicity? And of those who did read them, how many soaked them in? Were they believed and taken to heart? Or were they forgotten forthwith as vain ideals, phrased by some publicity fanatic of more words than experience?

How much of their import went clear over the heads of the folks who say the yeas and nays of street railroading? That's the test. Did *they* get it? Did the series set them to thinking that perhaps after all some of this talk about the value of publicity is more than mere verbiage; that it points the way to some practical and desirable results—did they catch these truths?

If only a few of them did the JOURNAL has hastened measurably that day when publicity will be a real factor in electric railway affairs.

The JOURNAL'S editorials advanced many strong arguments. I should like to see them distilled to their epigrams and kept constantly before the men who make and break policies.

One of these was that corporation publicity is no press agent work; that the man to perform it must have "enough size and weight to make his superiors allow him to do the right thing in spite of their prejudices and previous habits." These are bold specifications, and radical—but right. Publicity under the old rules of repression would not be publicity at all.

And another was this: "The very fact that a company is trying by a frank policy of publicity to set itself right with the public inevitably leads its employees into the same attitude." This is one big result rarely included in the estimates.

"The kind of publicity that sticks its head in the sand never accomplishes very much," said another. In truth, it never accomplishes anything. It is not publicity.

"Successful publicity must concern itself with things about which the public is clamoring for information," for if it doesn't, the public will get misinformation about those same things, which is just what publicity must prevent.

"If explained as they arose, there would be few serious controversies between corporations and the public they serve." And if the explanations be started long before they arise there will be still fewer serious controversies.

"The best man to do the every-day cultivation of the newspapers is the publicity man." Because he knows just what sort of cultivating to do—which is the self-respecting sort that begs no favors and peddles no alms; and just how much—which is mighty little.

But I could keep on quoting till I reproduced the series.

A certain prolific syndicate writer who formerly was a minister has retained the wonderful faculty of discussing with an air of finality any subject under the sun. But recently he said something. He praised advertising (which is an integral part of publicity), because in it "business becomes vocal." Industry and organization, said he, "are dumb giants until they find speech—dumb and dangerous."



W. T. WATERS

"The telephone people are spending a deal of money talking to the public through the newspapers," he continued. "It is the wisest, shrewdest move a corporation ever made. Somebody in the telephone company had vision."

Then this: "Railroads, street cars, gas, electricity companies and similar forms of public utility are in a bad way. They complain that every man's hand is against them and that legislation is hostile. The cause of their plight is that they have not advertised properly. Even at this late day an intelligent program of advertising might save them. Without that, their days are numbered."

It may not be quite so bad as that; but, anyway, there's an outsider's suggestion. He happens to be an outsider whose writings are read (and believed in, to the last syllable) by a great many people in a number of cities.

Publicity ought to have become a well-marked line of activity among corporations when the early muckrakers put on paint and feathers.

But it was overlooked then, or deferred, or rejected, and therefore is all the more important now. The people have had their temporary fill of crusading and have constituted themselves into a vast jury with some growing sense of responsibilities. To win the verdict of this jury the corporation must employ publicity in all forms. And to do that effectively it must retain publicity counsel, just as it must retain legal counsel upon matters pertaining to courts of law. The public is not to be censured for the prejudiced verdict that is apt to follow if it hears nothing, either evidence or argument, from the utility's side of the court, or if what it hears from there is haltingly and weakly presented.

In the end public opinion is irresistible. It controls the legislative, administrative, executive and judicial departments of state and city. They are mere agencies and instruments of its will. Its recognition has got to be merited, and sought, and won.

The cause that is just need not fear this tribunal. True, human nature will retain its emotions, and to an extent can be swayed by them into prejudice. But, also, it will hold to its faculties of reasoning. By addressing itself to the average intelligence of the average man and woman, the utility will win that deserves to win.

Regardless of ifs and buts, however, utilities stand before the bar of public opinion whether in fear or in confidence. They're there, and they've got to make

the best of it. They've got to plead their cause. They've got to employ publicity in some form, in some degree, and while they are about it they might as well use it fully and effectively.

Perhaps some indifference toward public opinion still survives here and there among utilities. Or perhaps the flayings they suffered in bygone years have left some controlling individuals raw to the touch even of balms and unguents. It may be some were burned so often and so cruelly by publicity in hostile hands that now the very sound of its name twangs their nerves anew.

Goodness knows these unfortunate gentlemen, if such there be, will find it easy to continue so by shrinking from publicity that is in their own behalf. Of course, they organize other defensive measures. Of course, they overlook no other detail. Yet they would forego this. They have not yet realized that to resist without it is but to temporize with the final issue. They may have their assailants licked to a frazzle on points, but unless the public knows it, what's the use in the end? Unless the lawyer convinces the jury, where does he get by having a better case than his opponent?

The fact that one has been seared by publicity's hot irons does not warrant his refusal of their defense in the hands of one who knows which end to pick them up by. Then he should be after enjoying the sights that he can see. For publicity can be just as effective in defense as in aggression—much more so, in fact, if the aggression be ignoble.

The basic principles of publicity are not subject to challenge. They are cut in the stone. But their practice may be a matter of individual method. Right there the human equation enters. Different men may interpret controlling circumstances from different angles of understanding. On each must rest the responsibility of his own course.

For my part, I believe optional expediency never should govern when it compromises the principles of publicity. As to when expediency is optional and when not—there again enters the human equation. I think the situation is rare in which the honest utility can be compelled into surrender.

Voicing my own opinion still, I believe expediency is optional and that it compromises the far-seeing principles of publicity when it demands for the sake of temporary peace that some graft, polite or impolite, be countenanced. For instance, an artificial and superimposed advertising rate is assessed against a utility by some newspaper, as though its advertising were objectionable and to be penalized with that of clairvoyants and quacks and other fakers. Though this segregation is without excuse in conscience or reason in business, the newspaper has unquestioned privilege to declare it. But it has no right to coerce the utility into buying space at the spurious rate. Again, worthless or superfluous advertising is proffered with the intimation that the utility must buy. Both of these are dishonest practices. They and similar forms of blackmail will be tolerated no longer by any company from any quarter when those who own the utilities feel the courage of their moral position.

Again, it is my opinion that the time of all times for any corporation to press the accelerator on its publicity is when it is under attack. This opinion may be confronted by that of experienced electric railway men that the better course is to lie low and let public interest pass on. But would it do that any sooner? Public interest in a given topic endures just so long and no longer. Determined defense by a utility under fire will not prolong this interest unduly, but on the contrary may dissipate it by clarifying the issue and anticipating discussion. Moreover, if it has the public's good opinion, the utility stands to lose too large a measure of that by remaining silent under abuse. The time to convince the public mind is while that mind is open to what you have to say. Silence emboldens the pack to yap the harder, engenders the suspicion that there really is something up the tree and brings no end to anything.

"A lot of disappointments have been caused by the hiring of reporter press agents," said one of the JOURNAL'S editorials. Care should be taken, as the JOURNAL took it, to charge those disappointments against their true cause. By no means do they demonstrate the failure of publicity as a policy.

To attract the best men and hold them, publicity must be recognized by the utilities as a worthy and technical calling and must be compensated as such. To pay for reporter press-agent service and expect something of a higher order is unreasonable.

The field of utility publicity is broadening and begins to offer those further possibilities of progress which inspire effort. The demand is for workers who realize that the day of special pleading has passed and that specious defense is worse than none at all, who can retain the viewpoint of the critical outsider and address to his understanding and acceptance the truths about public service.

But the mere securing of the right man and the mere designating of him with some entitlement—this is but the beginning of deliberate publicity. The name of the thing is not enough. The concession of the theory, the recognition of the policy accomplish little. Beyond and above these the fearless spirit of publicity has got to be there.

Publicity does pay. It is but advertising—broad and far-visioned advertising. All of us advertise, whether consciously or not. We bow to good taste in personal matters. We demand creditable business stationery and presentable offices. We pay commensurate rent for locations on good business streets. We spend money to keep our cars varnished and our windows washed. All this is advertising or publicity, and every cent we put into it is well invested. Every day of our lives we adhere to the credo that publicity judiciously advanced certainly pays.

As a cold, strict, absolutely calculating business proposition publicity pays not only in more zealous loyalty among employees and in fair treatment dictated by public esteem, but also in dollars and cents that flow from that loyalty and that esteem; in increased demand for whatever we have to sell, whether it be car rides or cabbages.

The electric railway that depends for its dividends on the fortunity that if people ride in street cars they must pay it their nickels is not only foolish and pathetically myopic, it is precariously near the edge of big trouble.

A whole lot of folks have a say-so in the conduct of every corporation, be it public or private. And that's the rub. They have many conflicting opinions. The convincing of their majority that publicity offers peace to their business souls and fair wages to their commercial investments is not a task that can be lightly disposed of.

Therefore it is that I wonder how many owners and creditors and managers read the JOURNAL'S editorials and absorbed them and were moved by them to determination upon action.

How many, and who?

It is an interesting question. The answer could foretell much of the to-morrow of public service by private capital.

Special Ideas in Publicity Work

By E. B. Atchley
Publicity Agent Kansas City Railways Company

TEXT: *"Whatsoever ye would have the people do unto you, do ye even so unto the people"—and it will be done.*

THIS is a little sermon—a little sermon on publicity—and it covers every publicity idea under the sun. The publicity department ought to be a flood of sunlight, diverging in all directions from the heart of every public service concern, enveloping all the people served.

But the heart of the corporation must be there, and the chief executive is the heart. That publicity department is unsuccessful which does not have standing back of it the right kind of a chief executive, for he, too, needs must have as thorough an understanding of human nature as the publicity department. In this the Kansas City Railways' publicity department is most fortunate.

Secretiveness has been the curse of public service corporations because secretiveness brought only the just condemnation of an interested public—no praise. The people want to be friendly, and they will be, save for a few meddlers, if they are taken into the corporation's confidence. The public will treat you as you treat the public, and present opportunities for good publicity work enabling the department to grasp these opportunities. That is keeping *ahead* of the procession!

Recently the Common Council of Rosedale, a suburb of Kansas City, protested against the cars in use by the Kansas City Railways, and adopted a resolution prohibiting their operation.

The controversy brought bitter words, and while the break was bridged temporarily, the bad feeling was not wholly removed. In a few weeks a movement started by Rosedale women for a big playground, and the Railways' publicity department was the first to give aid in pushing the movement. Cards were carried on the cars boosting the playground, while newspaper stories urging the people to help found their way into print from this department. While this work meant no financial return to the company it did mean a better feeling, and to-day the women of Rosedale sing the praises of the Railways. The Golden Rule did it!

Knowing that all Kansas City was interested in the November election, the Railways arranged with the light company for a system of signals to announce the results as soon as the telegraph brought the news. The newspapers took up the plan, carried stories on it from day to day, and it was talked everywhere. The plan was carried out, with the result that everybody on the cars, as well as the people who remained at home, knew who had won as quickly as the people who watched the bulletin boards. Everybody was pleased.

Space has been given on the front of the cars in the last few months to promote public welfare, church, school and hospital work to show the Railways is interested and willing to aid in promoting any movement for the public good. Undoubtedly the assistance given these measures has aided the Railways materially in its efforts to relieve traffic congestion, for the organizations boosted have, in turn, fought for better traffic regulations on the part of the city. In some of this work the publicity department has gone outside its regular duties to assist in the preparation of newspaper stories, but everything done has been productive of splendid results.



E. B. ATCHLEY

Kansas City inaugurated a "health week" early in December, holding big meetings in Convention Hall, where a "health evangelist" exhorted his hearers to live up to the health rules laid down. The railways joined in the movement, helped in the newspaper publicity work, placed cards on the front of the cars calling attention to the meetings and prepared health literature for distribution on the cars. Every health advocate in the city talked about what the Railways was doing—and he liked it. The Railways did for the health advocate what it would like the health advocate to do for it under similar circumstances, and it naturally brought good will. Isn't this the object of a publicity department?

The safety work inaugurated by the Railways publicity department has been thoroughly "covered" in the ELECTRIC RAILWAY JOURNAL, but in the few months it has been carried on the work has developed wonderfully. Safety patrols have been established by all schools, essays are written by pupils, and the various local school publications carry articles on safety. These things followed the work of the safety director carried on in the schools, but they also indicated co-operation as a result of the publicity department having taken a part in pushing school athletics, evidencing more strongly the biblical truth.

Just one more word about building good will in a special manner. When the national encampment of the Grand Army of the Republic was held in Kansas City last August, this department issued a small daily newspaper called "The G. A. R. Edition" of *The Railwayan*, this being the title of the company's magazine for its employees, which carried all official news of the encampment and 20,000 copies of which were distributed free each day. Everybody interested in that encampment clamored for recognition in that little newspaper. It was made the official organ, and resolutions were adopted indorsing, praising and proclaiming all the other necessary good will, friendship, etc. Thousands of visitors saved every copy, many wrote back for extra copies after they went home, congratulatory letters came in by the dozen, and that paper was the talk of the town. It simply made a big hit, and the 20,000 veterans went back to their homes declaring Kansas City had the best street railway system on earth, to which every employee of the company wholly agreed. The little newspaper did it!

And now a word about newspaper publicity. Hardly a day has gone by in the last ten months since the Railways established its publicity department that the newspapers have not carried favorable mention of the

company. Of course, there has been criticism—some just, some unjust. When the criticism has been unjust it has always been regarded as an unintentional error, and so treated in discussing the matter with the newspapers, the man who wrote it never being blamed and no anger being displayed. Reporters from every paper in the city call daily at this office, being kept advised of the Railways plans, frequently a week in advance of the time of publication, and not one has violated the confidence. They are as careful not to violate a confidence as a company official. In the news submitted for publication no effort is made to boost the company, no facts are hidden. The truth is always told. In this manner the Railways' publicity department has established a feeling of confidence in the statements made. Every effort is made to be fair—and news is judged mainly from the viewpoint of the public and the newspaper man, not purely from the company's viewpoint. This, it is considered, is a vital matter in the publicity work. If the newspaper becomes convinced the publicity man is "coloring" news, all information coming from the department is regarded as "colored." As a result of the confidence established, when an accident is reported to police headquarters involving the Railways, almost the first step of the reporter "covering" it is to call this department. If the information is not at hand the department secures it, looks into every angle of it and supplies the details. The newspapers take the statements as true. Wishing to be dealt with fairly, the Railways deals with the newspapers fairly—and the plan has proved to be right in Kansas City.

Whatsoever ye would that any or all should do unto you, do ye even so unto them, is the great fundamental law, or idea, of publicity, o'ershadowing everything, reaching even unto your enemies. Opportunities will bring forth the lesser and more special ideas, differing as to localities and dependent wholly on the brain that directs the work. The flood of sunlight will loose itself.

"Straight-Talk" Publicity

By E. E. Soules

Manager Department of Publicity, Illinois Traction System

THE AUTHOR *Outlines the Policy of the Illinois Traction System, Which Is Invariably to Tell the Company's Story First Thereby Obviating the Necessity for Defensive Campaigns to Meet Popular Criticism Based on Misinformation.*

IF the illustrious David Harum had given the same thought to the psychology of public utility operation that he gave to horse trading it is almost a certainty that his advice would have been to "tell the truth about yourself—and tell it first."

Actual experience has convinced the operators of American public utilities that publicity, rightly used, is a valuable factor in producing and maintaining desirable relations with the public. As to the method to be used, it has been demonstrated that this is dependent in large measure upon local conditions. It is impossible to lay down a hard and fast set of publicity commandments that will apply to all properties. There are scores of publicity mediums, and the first duty of the executive who has under his direction the outlining of the publicity policy of his property is to pick the medium that will work to best advantage in his particular territory. Then follows the selection of method of appeal to be used through this medium.

It is possible, however, to form some conclusions from the experience of others, and the results of the publicity efforts and methods pursued by a company that has pioneered in public utility publicity should be of interest to the present-day public utility operator.

The Illinois Traction System, operating some 800 miles of interurban and city railway, with gas, electric and steam-heat plants in twenty-five cities in the Central West, was perhaps one of the first companies of its kind to establish a publicity department. The innovation was worked out and put into effect by H. E. Chubbuck, vice-president executive, and since 1909 the publicity department has been a fixture with this property.

The company started its publicity work at a time when part of its property was in the development stage. This is an advantage. During this period the management has a story to tell that is welcome in the community in which it intends to operate. The ordinary reader is interested in learning of the plans of a new enterprise. He likes to feel that he is being given advance information on a project that affects the prosperity and development of his particular neighborhood. If he is taken into the confidence of the company at the outset he is very likely to take a personal interest in the affairs of the company in years to come.

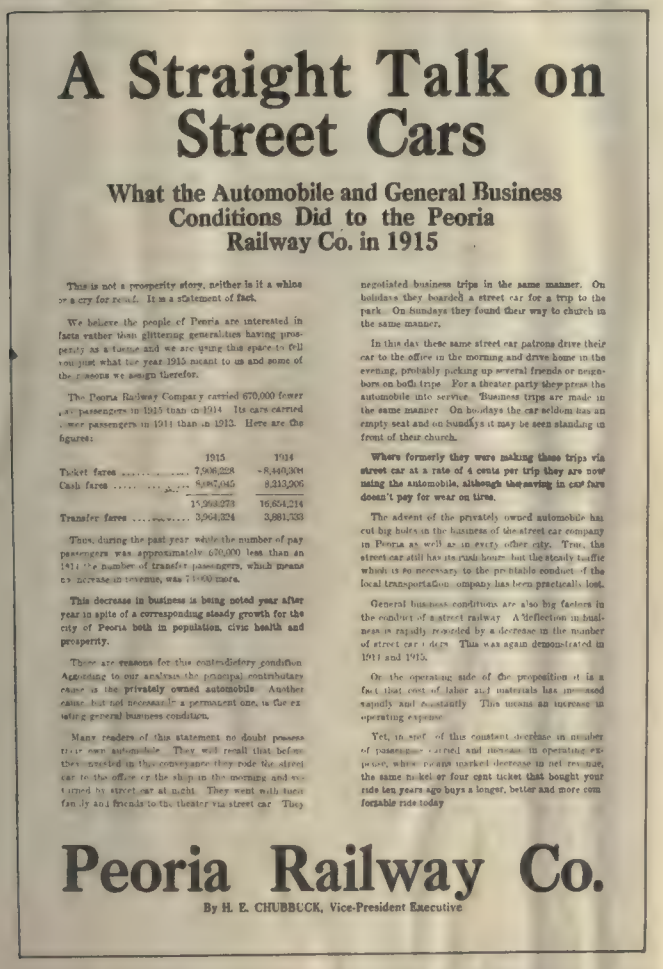
From the beginning the publicity policy of the Illinois Traction System has been based upon the use of the newspaper as a medium. For this reason the publicity department has been in charge from its inception of a man taken from the newspaper field. The original idea of co-operation between the management of the property and the newspapers has not been changed. It has been the aim of the company to constantly impress upon the mind of the publishers in its territory the idea that its publicity department is at their command at any and all times for the furnishing of any information that may be consistently given in regard to matters of public interest. It has not been the intention of the company to "work" the editorial or news rooms of the publications for free, or complimentary write-ups, nor to save on its advertising bills by "slipping in" editorial matter of an advertising nature.

However, instances of co-operation between the company and the editorial rooms of the newspapers appear in connection with accidents, wrecks, new extensions, purchasing of equipment, etc. In case of an accident it is the policy of the company to place every means for the securing of necessary information at the disposal of the newspaper man. Requests from the newspaper man for information on matters of news interest concerning the company's affairs receive immediate and careful attention. Another example of this kind of co-operation is the issuing of a "press sheet" at frequent intervals. This contains short news stories written in newspaper style so that they reach the news editor's desk in such shape that he can use a few or all of them at his own convenience and discretion. This news sheet is mimeographed and mailed to a list of all publications in the territory.

The publicity department is not used to keep the newspaper man out of the office of the executive officials.

The door of the highest official is always open to the newspaper man with a legitimate request for facts. Nor is the department used for the suppression of bad news. The policy of the company is to give the newspaper man the bad news along with the good and to ask only in return an even break on editorial comment or news "position."

When the company has a story to tell that deals with a question of public policy it buys and pays for sufficient space in the newspapers to tell it. Its policy is to place this display advertising copy with all newspapers in the territory affected, regardless of the editorial policy of the paper. It considers the avoidance of hostile



A Straight Talk on Street Cars

What the Automobile and General Business Conditions Did to the Peoria Railway Co. in 1915

This is not a prosperity story, neither is it a whine or a cry for relief. It is a statement of fact.

We believe the people of Peoria are interested in facts rather than glittering generalities having prosperity as a theme and we are using this space to tell you just what the year 1915 meant to us and some of the reasons we assign therefor.

The Peoria Railway Company carried 670,000 fewer paying passengers in 1915 than in 1914. Its cars carried fewer passengers in 1914 than in 1913. Here are the figures:

	1915	1914
Ticket fares	7,906,228	8,440,308
Cash fares	5,067,045	8,213,906
	15,268,273	16,654,214
Transfer fares	3,964,324	3,881,733

Thus, during the past year while the number of pay passengers was approximately 670,000 less than in 1914 the number of transfer passengers, which means no decrease in revenue, was 74,000 more.

This decrease in business is being noted year after year in spite of a corresponding steady growth for the city of Peoria both in population, civic health and prosperity.

There are reasons for the contradictory condition. According to our analysis the principal contributary cause is the privately owned automobile. Another cause, but not necessarily a permanent one, is the existing general business condition.

Many readers of this statement no doubt possess their own automobile. They will recall that before they invested in the conveyance they rode the street car to the office or the shop in the morning and returned by street car at night. They went with their family and friends to the theater via street car. They negotiated business trips in the same manner. On holidays they boarded a street car for a trip to the park. On Sundays they found their way to church in the same manner.

In this day these same street car patrons drive their car to the office in the morning and drive home in the evening, probably picking up several friends or neighbors on both trips. For a theater party they press the automobile into service. Business trips are made in the same manner. On holidays the car seldom has an empty seat and on Sundays it may be seen standing in front of their church.

Where formerly they were making these trips via street car at a rate of 4 cents per trip they are now using the automobile, although the saving in car fare doesn't pay for wear on tires.

The advent of the privately owned automobile has cut big holes in the business of the street car company in Peoria as well as in every other city. True, the street car still has its rush hours, but the steady traffic which is so necessary to the profitable conduct of the local transportation company has been practically lost.

General business conditions are also big factors in the conduct of a street railway. A deflection in business is rapidly recorded by a decrease in the number of street car riders. This was again demonstrated in 1911 and 1915.

On the operating side of the proposition it is a fact that cost of labor and materials has increased rapidly and constantly. This means an increase in operating expense.

Yet, in spite of this constant decrease in number of passengers carried and increase in operating expense, which means marked decrease in net revenue, the same nickel or four cent ticket that bought your ride ten years ago buys a longer, better and more comfortable ride today.

Peoria Railway Co.

By H. E. CHUBBUCK, Vice-President Executive

ILLINOIS TRACTION SYSTEM PUBLICITY—A "STRAIGHT TALK" ABOUT THE AUTOMOBILE

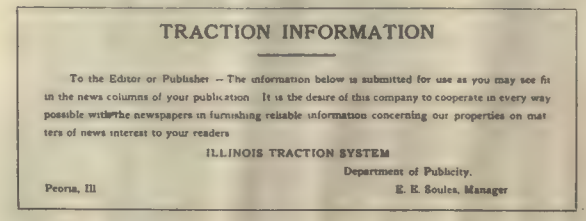
newspapers as a short-sighted policy. Equal space is usually placed with all newspapers regardless of editorial opinion.

TYPICAL "STRAIGHT TALKS"

Different styles of copy have been used in different cities, the actual method of appeal depending upon local conditions. For instance, on one property a series of "Straight Talks on Street Cars" was used in which the problems of the local street car company were set forth. In another city "Plain Talks About the McKinley Company in Your City" were carried on, the copy dealing with the conditions under which the gas and electric company operated in that community. In another city the affairs of the company were set forth in opposing a municipal ownership bond issue; while in still another the advertising columns of the newspaper were used to explain reasons for and conditions under which the company intended to appeal to the proper regulative body for an increase in tariff rates.

In all of the company's newspaper advertising it endeavors to place its message in words that will be understood by the average newspaper reader. It adopts the "heart-to-heart" attitude, with the human interest side of its story uppermost, at the same time maintaining the proper amount of dignity. Technical expressions are avoided, and in no instance is copy used that can be construed as antagonistic to individuals or classes. Especially is this true in cases such as a campaign against municipal ownership or some such propaganda where there is divided opinion in the public mind.

Personalities in company advertising are religiously avoided. The loss of dignity and broad-mindedness which should characterize the efforts of a public utility company is far greater from the use of personalities than any gain. The company endeavors to make statements rather than refute them. In other words, it endeavors to tell its story first, whether it be good or bad,



TRACTION INFORMATION

To the Editor or Publisher -- The information below is submitted for use as you may see fit in the news columns of your publication. It is the desire of this company to cooperate in every way possible with the newspapers in furnishing reliable information concerning our properties on matters of news interest to your readers

ILLINOIS TRACTION SYSTEM

Department of Publicity.

Peoria, Ill. E. E. Soules, Manager

The electric railways were the first to use the telephone in dispatching cars or trains, in fact have never used any other system. The best evidence of its value has been its adoption by a number of steam railroads, among which are several of the important railway systems of this country. When it is considered that the movement of electric trains is much more frequent and constant than on a majority of steam roads the proficiency of this method of dispatching is demonstrated.

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The fifth annual picnic of employees of the general shops of the Illinois Traction System at Decatur, Ills., will be held in Miller Park, Bloomington, Ills., on June 22. This event is annually participated in by several hundred employees of the Traction System and it is anticipated that Congressman W. B. McKinley, President of the Company, will attend as is his custom.

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A comparison of electric railway statistics for the month of October, 1916, with figures for the corresponding month of 1914 made by the American Electric Railway Association indicates that, as a whole, the electric railway business in the United States has changed but little during that period. Data from 107 city and interurban companies reporting to the Association shows an increase in operating revenue of 1.47 per cent, in operating expenses of 0.74 per cent, and in net revenue of 2.42 per cent, while data for 87 of these companies indicates an increase in taxes of 8.30 per cent

ILLINOIS TRACTION SYSTEM PUBLICITY—NEWS SHEET FURNISHED TO EDITORS AT FREQUENT INTERVALS

rather than to spend space and money later denying or explaining statements of the opposition or the uninformed.

The company endeavors to get the thought to its patrons that it is doing the best it can in the way of furnishing adequate service. It does not claim in all cases that it is furnishing the best possible service, but that it is giving the best service possible under existing conditions. Where such conditions handicap the company an effort is made to explain them.

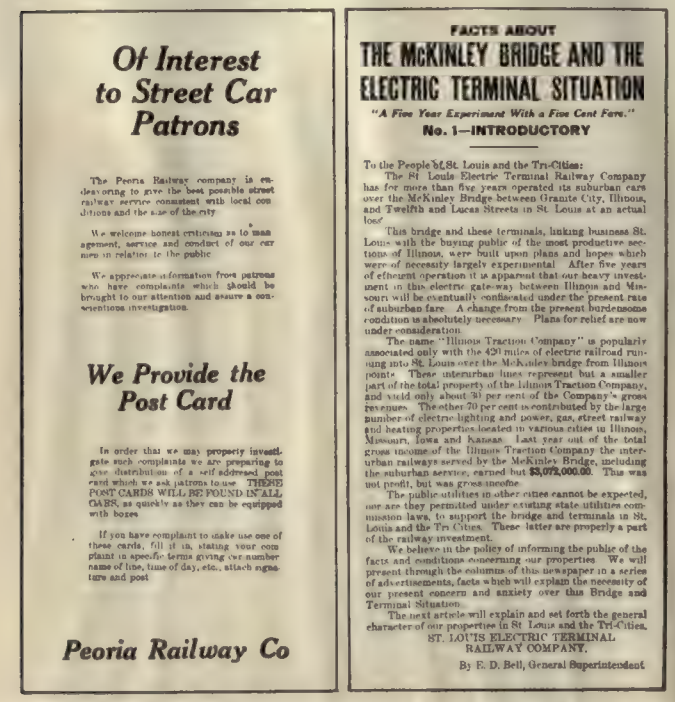
An example of "straight-talk" publicity used by this company is the full-page display copy which was used widely in the New Year and "Prosperity" editions of newspapers early in 1916. Where it has been customary for utility companies to patronize these "special editions" of newspapers with copy expressing the compliments of the season or pledging co-operation during the coming year, this company used copy showing what the privately owned automobile did to the local street-car company in the year previous. That this piece of copy produced results was evident from comment both from newspapers and individuals. At any rate, it is believed that it set some of its patrons thinking along constructive lines.

A typical series of "straight talks" used by this company for one of its local street railway properties at

a time when no particular point was at issue, contained the following subjects:

In some cases this copy was illustrated with diagrams or halftone cuts, but for the most part the company depended upon the type alone for the telling of its story.

1—What One Car Traveling One Mile Earns in Peoria and Elsewhere.
2—You Can't Judge the Earning Capacity of a Street Car by the Load It Carries.
3—Your Nickel, and What Part of It the Street Railway Company Retains as a Profit.
4—The Investment of a Street Railway in City Pavement.
5—What a Crowded Car During the Rush Hour Does and Does Not Mean.
6—The High Cost of Living and Your Street Car Fare.
7—The Development of the Street Railway Track and What It Has Cost the Industry.



Of Interest to Street Car Patrons

The Peoria Railway company is endeavoring to give the best possible street railway service consistent with local conditions and the size of the city.

We welcome honest criticism as to management, service and conduct of our employes in relation to the public.

We appreciate information from patrons who have complaints which should be brought to our attention and assure a conscientious investigation.

We Provide the Post Card

In order that we may properly investigate such complaints we are preparing to give distribution of a self addressed post card which we ask patrons to use. THESE POST CARDS WILL BE FOUND IN ALL CARS, as quickly as they can be equipped with boxes.

If you have complaint to make use one of these cards, fill it in, stating your complaint in specific terms giving car number name of line, time of day, etc., attach signature and post.

Peoria Railway Co

FACTS ABOUT

THE McKINLEY BRIDGE AND THE ELECTRIC TERMINAL SITUATION

"A Five Year Experiment With a Five Cent Fare."

No. 1—INTRODUCTORY

To the People of St. Louis and the Tri-Cities:

The St Louis Electric Terminal Railway Company has for more than five years operated its suburban cars over the McKinley Bridge between Granite City, Illinois, and Twelfth and Lucas Streets in St. Louis at an actual loss.

This bridge and these terminals, linking business St. Louis with the buying public of the most productive sections of Illinois, were built upon plans and hopes which were of necessity largely experimental. After five years of effeourst operation it is apparent that our heavy investment in this electric gate-way between Illinois and Missouri will be eventually confiscated under the present rate of suburban fare. A change from the present burdensome condition is absolutely necessary. Plans for relief are now under consideration.

The name "Illinois Traction Company" is popularly associated only with the 420 miles of electric railroad running into St. Louis over the McKinley bridge from Illinois points. These interurban lines represent but a smaller part of the total property of the Illinois Traction Company, and yield only about 30 per cent of the Company's gross revenues. The other 70 per cent is contributed by the large number of electric lighting and power, gas, street railway and heating properties located in various cities in Illinois, Missouri, Iowa and Kansas. Last year out of the total gross income of the Illinois Traction Company the interurban railways served by the McKinley Bridge, including the suburban service, earned but $3,072,000.00. This was not profit, but was gross income.

The public utilities in other cities cannot be expected, nor are they permitted under existing state utilities commission laws, to support the bridge and terminals in St. Louis and the Tri-Cities. These latter are properly a part of the railway investment.

We believe in the policy of informing the public of the facts and conditions concerning our properties. We will present through the columns of this newspaper in a series of advertisements, facts which will explain the necessity of our present concern and anxiety over this Bridge and Terminal Situation.

The next article will explain and set forth the general character of our properties in St. Louis and the Tri-Cities.

ST. LOUIS ELECTRIC TERMINAL RAILWAY COMPANY.

By E. D. Bell, General Superintendent

ILLINOIS TRACTION SYSTEM PUBLICITY—ADVERTISEMENT FOR COMPLAINT CAMPAIGN; TELLING THE COMPANY'S STORY FIRST

8—The Street Car You Rode in Then; the One You Ride in Now, and What Your Ride Costs.
9—How the Cost of Street Railway "Overhead" has Advanced with the Times.
10—Your Street Railway Company as an Employer of Labor.
11—Twenty-One Million People Rode in Safety on Peoria Street Cars Last Year.
12—What the Peoria Railway Company Pays for Use of the Streets.

Supplementing these general publicity campaigns are special campaigns on subjects of public interest. For example, at the outset of the jitney invasion the company presented its side of the problem through "straight talks" in newspapers in the cities principally affected by the invader. Typical pieces of copy on this subject were:

1—A Preliminary Chat on Street Railway Finance and the Jitney Bus.
2—Your Street Railway and the So-Called Jitney Bus—A Comparison.
3—Think of Safety When Choosing Between the Street Car and the Jitney Bus.
4—A Nine-Mile Street Car Ride for the Cost of a Three-Mile Jitney Bus Ride.
5—Jitney Comfort and Jitney Immorality—A Comparison with the Street Car.
6—What the Street Railway Company Pays for the Use of the Streets—A Comparison with the Jitney Bus.
7—The Jitney Bus Ruling and What It Really Means.
8—The Street Car, the Jitney Bus and the Working Man.

In presenting the case of the jitney bus the company did not endeavor to make the point that the jitney was all bad and the street car all good. Rather, it was held that there was, perhaps, a place for the jitney bus but that, if allowed to compete on equal footing with the street car, it should be willing to submit to equal regulation. Also, it was pointed out that the street car offered added conveniences for the same money, such as universal transfers, safety and comfort.

The company has used this style of copy on several occasions when proposed municipally owned plants threatened confiscation of its own local properties. It is in such campaigns that the difficulty of keeping away from personalities with individuals or factions is encountered. And it is especially desirable in this kind of campaign, the company has found, to tell its story first, to stay on the offensive rather than the defensive, to deal absolutely with facts and to induce the people to believe in the management. Circulars and other methods of publicity have been used in these campaigns, but the newspaper advertising campaign has been the nucleus about which all the rest has been built.

The company feels that its publicity efforts have been well rewarded in these campaigns, and in a majority of cases the vote of the people has expressed their confidence in the company and its cause.

A Complaint Campaign

Appreciating the fact that the public is entitled to have personal attention given its complaints, this company inaugurated a "complaint campaign" on one of its local street railway properties which met with considerable success. Boxes placed in all city cars contained a supply of return post cards with a message from the company inviting complaints from patrons as to the management, service and conduct of trainmen and asking for suggestions. Ample space was provided for writing the complaint, and the only requirement was that the card should be signed with name and address of the complainant.

Newspaper space was liberally used in calling attention to this request for complaints, and during each of the first two or three weeks about 100 complaints and suggestions were received. Each communication as received was given attention by the local superintendent, and a personal letter of acknowledgment was written to the complainant. In many cases suggestions were adopted, and when this was the case the complainant or suggestor was courteously thanked for his interest. Where it was impossible to adopt suggestions a special effort was made to explain the reason.

After a few weeks the number of complaints gradually decreased. The patrons of the company who had suggestions stored away for several years past had evidently been satisfied by this personal attention and ceased making complaint when they learned that the company evinced a real interest and was making an honest effort to comply with the wishes of its patrons to the best of its ability.

In conclusion, it may be said that the Illinois Traction System has not solved all of its problems through use of publicity. It is still misunderstood, as are many other utility companies in many questions of public interest. Some of its efforts to present its cause have seemed to fail. But its officials believe that it enjoys much good will and has a better standing in the communities in which it operates by reason of frank and honest presentation of its side of questions of public interest.

Street Railway Advertising: When, How and Why

By Frank Putnam
The Milwaukee Electric Railway & Light Company

THE OBJECTS *of Such Advertising Should Be to Secure Increased Patronage, Fair Play from City and State Regulating and Taxing Agencies, and the Friendship of the Public—Advertisements Should Appear Continuously, not Spasmodically.*

THIS comment applies specifically to street railways operating under state regulation of capital, value, earnings, service, rates, accounting, etc. In part it may apply also to street railways operating under city regulation, or none. It is based upon somewhat more than twenty years' study of the business from the outside, as an active advocate of municipal ownership, and upon somewhat less than two years' study of the business from the inside, as an advocate of company ownership under state regulation.

When I advocated municipal ownership, I did so believing the surplus earnings of the business should go into the city treasuries, to support non-productive municipal services. I believed municipal ownership was the only way the public could get a fair share of its carfare spent for car service and the only way that the corrupt jobbing of franchises and the dishonest flotation of watered securities could be stopped.

To-day I advocate company ownership, under state regulation, because I have learned that under state regulation "there ain't going to be no core to this apple"—no surplus profits to be used for any other purpose, because it is apparent that State regulation is a surer and better way than city ownership to get a fair share of the carfare spent for car service, because under state regulation franchises no longer have any value except for taxing purposes, and because under state regulation the flotation of watered securities is impossible.

The public has got the results it wanted, but by another route than the one we early advocates of municipal ownership advised it to travel.

Some of my Socialist friends, who believe in the public ownership of all property because they believe in it, and some of my practical politician friends, who are able to visualize the fat pickings that would be made available under city ownership and political control of street railway payrolls, stubbornly declare state regulation of the business to be a failure. From their point of view it is a failure.

Some street railway operators, I suspect, harbor the idea that in the long run they will be able to "regulate the regulators."

They won't. They're dreaming. The state street railway regulators are on the public payroll. Here and there one of them may temporarily lean to mercy's side, so to say, but as a rule and in the long run they are going to give the public the big half of the apple.

State regulation has made good in some of the states. It will make good in all. It establishes company ownership and operation of street railways on a public service basis—the only tolerable basis from the public's viewpoint—the public through its own agencies saying what kind and amount of car service it wants and assuring the company owners a fair rental return on the cost of providing such service and not a penny more.



FRANK PUTNAM

If any street railway company is not satisfied with that prospect under state regulation, it can either sell out while the selling is good or it can encourage the gradual confiscation of its property by cultivating a chronic grouch and fighting its job.

My brief comment on street railway advertising, now to be written, is addressed to street railway investors and operators who are satisfied with that prospect.

Street railway companies should advertise to get two results chiefly: (*a*) Increased patronage; (*b*) fair play from city and state regulating and taxing agencies, and public friendship.

Advertising for increased patronage should be continuous—every day in the year—straight sales advertising. The riding habit, like any other, can be encouraged by apt suggestions, varied and repeated daily—just as the buying habit has been increased tenfold within a generation.

Public relations advertising should be used to make the public acquainted with all facts regarding the street railway service that the citizen gets as a matter of right regarding his city owned and operated services. Under state regulation the street railway company is only a group of citizens chartered to perform a public service for a going wage to the capital and labor required by that service. The public has an unquestioned right to know as much about this public service as about any other. It is to the interest of a street railway company that is conforming to the letter and spirit of state regulation to have the public know all about it. Possessing this knowledge, the public won't listen to unjust attacks upon the company. Nobody—either predatory politicians or sensational newspapers or even the Socialist agitators—will dare make unjust attacks upon the company when the public knows all the facts in the case.

If state rate regulators fix fares and hauls on a losing basis, so that the company can't earn on its officially determined earning value the fair return which state regulation generally has indicated to be necessary to maintain sound credit and give good service, the company's best recourse is an appeal straight to the public in newspaper advertisements. The American people are on the square. They don't want anybody's property confiscated. They won't have it done in their name if they know it. The exceptions to this rule nowhere form more than a noisy minority.

Street railway companies, approaching this task of establishing friendlier relations with the public by means of publicity, must bear in mind that the public

as a whole is not yet habited to the idea that state regulation has stopped stock watering, franchise jobbing and excessive dividends. The extraordinary change which state regulation has made in the relation of the utility companies to the public are but dimly understood by the average citizen. Some of the facts which every street railway company under state regulation needs to fix in the public mind are these:

1. That a franchise no longer has any earning value or any sale value; in a word, it is no longer a "special privilege"; has, in fact, no use except to serve as an excuse for levying an extra tax on street railway receipts.

2. That identical street railway service would cost at least as much—for plant, labor and interest on capital—under city as under company ownership, and that company management will invariably be more energetic and efficient, and almost invariably more economical, than political management.

3. That the company has no more interest in "playing politics" than the department stores; that it is ready and eager to provide any kind and quantity of car service the public wants, provided the public's regulating and taxing agencies will let it earn and keep, for that purpose, revenue sufficient to provide that kind and quantity of service, pay a fair rental return to its owners and maintain good wages and fair working conditions for its employees.

The public still vividly remembers its unpleasant sensations experienced during the pre-regulation period of street railway development. It is not more than dimly aware of the new status of the business under state regulation. The new generation of operators can't spend money to any better purpose than for making the new status thoroughly understood.

But if any company has any extra cards up its sleeve, if it still thinks it can "slip something over" on the public, if its hands are not clean and its closets scoured, it had better clean up before it announces the housewarming.

And as for insinuated bogus "news" publicity calculated to mislead the public, why, that's old stuff. The public is on. That gun kicks harder than it shoots. When a street railway company talks to its public to-day it should do the talking in display advertising space, preferably over the signature of a responsible official speaking for the company.

The old public prejudices against street railway companies were not established in a day or a year; they were the product of a good many years of cumulative dissatisfaction, part of it justified, part of it due to public ignorance of street railway limitations which operators didn't have the merchandising wisdom to remove, as they might have done.

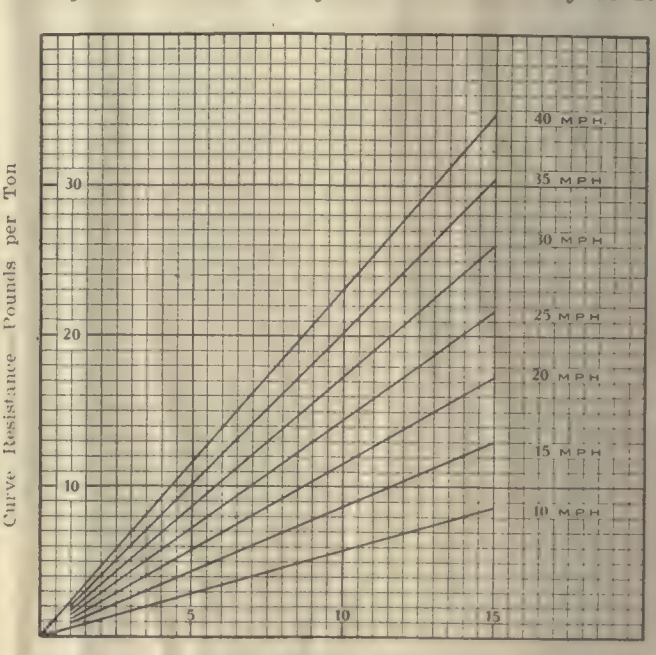
These prejudices can't be wiped out in a day or a year. The public sympathizes with a repentant sinner. Indeed, there is more joy in Zion over one black sheep that has repented than over ninety and nine whose feet have never slipped. But the public naturally wants time to make sure the repentance is genuine.

A Good Use for Safety Bulletins

The annual meeting of the Missouri Short Line safety committee was held in Liberty, Mo., on Dec. 19, 1916, fifty of the employees of the Kansas City, Clay County & St. Joseph Railway being present. Addresses were made by a pastor of the Disciples of Christ Church and a Catholic priest of Liberty, and by J. D. Bowersock, attorney for the road. R. S. Mahan, general passenger agent, who acted as toastmaster, had provided slips for each man on which had been written mottoes and statements concerning safety practices, culled by him from bulletins and publications of the National Safety Council. Most of the men, after reading the slips that had been handed to them, made short comments, relating experiences of the past few months and drawing lessons therefrom. Both of the ministers who spoke emphasized the importance of educating the public to proper practices while getting on and off cars, while on the cars, and while crossing the tracks. Both mentioned also the necessity of educating motor-car drivers in the means of avoiding collisions. J. R. Harrigan, general manager of the road, pointedly urged the men to be watchful of their own and others' safety.

Data on Car Resistance on Curves

Edward C. Schmidt, professor of railway engineering, University of Illinois, and H. H. Dunn, assistant in railway engineering, have recently published in the form of a University of Illinois Engineering Experiment Station Bulletin, No. 92, the results of tests of tractive resistance of a 28-ton electric car on curves. This is the test car which has been owned by the university for a number of years. It has a body 45 ft.



RELATION OF CURVE RESISTANCE AND CURVATURE AT VARIOUS SPEEDS, FROM UNIVERSITY OF ILLINOIS TESTS

long, trucks with 6 1/3-ft. wheelbase placed on 23¼-ft. centers, and four 50-hp. motors. The tests were made on track laid with 70-lb. T-rail on ties spaced on 24-in. centers, with super-elevation of the outer rail on curves varying from 0.75 in. on a 2-deg. curve to 5.9 in. on a 14½-deg. curve.

The results of the tests are expressed in the formula:

$$R_c = 0.058\ S\ C,$$

where R_c is the curve resistance in pounds per ton, S is the speed in miles per hour, and C is the degrees curvature. The results are also shown in the report in graphical form as in the accompanying sample diagram.

Full data of the tests are given in the bulletin, which can be obtained from the experiment station at a price of 25 cents per copy. In the introduction to the bulletin the authors acknowledge the assistance of the officers of the Illinois Traction System on which road the tests were made.

New Electric Rolling Stock for 1916

The Record of New Cars Ordered or Built in Railway Companies' Shops Shows a Total Approximating 3900—This Is a Marked Increase Over the Figures for Both 1914 and 1915, Which Is Mainly Due to the Large Number of New City Cars Purchased

THE annual compilation of figures covering new cars ordered by electric railways or built in electric railway companies' shops during the past year is shown in the table below. The railways represented in the figures own 97 per cent of all cars operated in the United States and Canada. From the total of 3942 it is apparent that the year, although by no means a banner one in car building, has seen a very distinct recovery from the low figures of 1915. Taken as a whole the figures are especially encouraging because of the large number of companies ordering cars, the total of 250 being about 50 per cent more than last year.

The following summary shows the record in condensed form since the year 1907, and classifies the cars according to the various services for which they were purchased. In this summary, of course, certain arbitrary dispositions have had to be made in special cases. Subway and elevated cars are considered as city equipments, as are also all storage-battery cars. Cars intended for use on suburban lines or for operation indiscriminately in city and interurban service have been classified as interurban equipment. Express cars, electric lomotives, funeral cars, freight cars and line and work cars of all kinds have been placed in the miscellaneous column.

Year	City Cars	Interurban Cars	Freight and Misc. Cars	Total
1907	3,483	1,327	1,406	6,216
1908	2,208	727	176	3,111
1909	2,537	1,245	1,175	4,957
1910	3,571	990	820	5,381
1911	2,884	626	605	4,015
1912	4,531	783	687	6,001
1913	3,820	547	1,147	5,514
1914	2,147	384	479	3,010
1915	2,072	336	374	2,782
1916	3,046	374	522	3,942

Special features of the statistics appear in connection with the number of electric locomotives ordered, which was 31, as compared with 43 ordered in 1915. The number of cars of all classes built in company shops was 445, thus showing a sudden increase when opposed to the figures of 165 in 1915 and 228 in 1914. A decrease took place in the number of gasoline-driven cars of all kinds. On the other hand, the number of one-man cars purchased during 1916 was materially greater than in 1915, the respective totals being 187 and seventy-seven. Purchases of automobiles and automobile trucks also displayed an increase. These figures are respectively twenty-nine and ten, but they have not been included in the lists of rolling stock.

The list of passenger cars is virtually divided between semi-steel and all-steel cars, showing a remarkable growth of popularity for the latter type of construction. Trail cars, however, have definitely lost popularity, since the lists include only seventy-one interurban trailers and 128 city trailers. The same thing applies to open cars of which only 131 were purchased and even this number is affected by the large single order of 127 constructed by the Public Service Railway of New Jersey in its shops. Of semi-convertible cars there were a total of 379, an insignificant number of fully-convertible cars being included in this figure.

In the lists below, space limits have necessitated certain arbitrary usages. All cars not specifically marked as trail cars may be considered to be equipped with motors. The classification of freight cars includes all gondola, box, flat and hopper bottom designs that are used to handle bulk freight. Cars less than 35 ft. long are marked to show one-man or two-man operation, and it is to be understood that cars longer than this are operated with two men. In connection with construction the term "all" refers to all-steel designs that have steel framing throughout, while the term "semi" applies to cars with steel carried only as high as the belt rail. Since practically none of the cars ordered during the year is of fully convertible type, the term "conv." has been used to indicate semi-convertible as well as convertible cars.

Railway	*Number*	*Type*	*Overall Length*	*Service*	*Construction*	*One-man?*
Aberdeen R. R.	2	Psr. Cl.	26	City	Semi	One
Albany Tr. Co.	1	Psr. Cl.	32	City	All	One
Alpena Lt. & Rv.	2	Psr. Cl.	33	City	Wood	Two
Alton, Granite & St. L. Tr. Co.	3	Psr. Cl.	54	Int.	All	..
Altoona & Logan Valley Ry.	5	Psr. Cl.	41	City	All	..
Anaconda Copper Mining Co.	2	Psr. Cl.	53	City	Wood	..
	1	Psr. Trail	47	City	Wood	..
Appalachian Pr. Co.	1	Psr. Cl.	33	City	All	Two
Arkansas Valley Int. Ry.	1	Psr. Cl.	56	Int.	Semi	..
	1	Exp.	50	Int.	Semi	..
Asheville Pr. & Lt. Co.	6	Psr. Conv.	35	City	Wood	Two
Atchison Ry., Lt. & Pr. Co.	3	Psr. Cl.	30	City	All	One
Aurora, Elgin & Chi. R. R.	4	Psr. Cl.	42	City	Semi	..
Austin St. Ry.	4	Psr. Cl.	30	City	All	One
Bangor Ry. & Elec. Co.	3	Psr. Conv.	43	Int.	All	..
	3	Psr. Cl.	33	City	Semi	Two
Bay State St. Ry.	200	Psr. Conv.	43	City	Semi	Two
	7	Exp.	40	..	Semi	..
	5	Frt.	40	..	Wood	..
Beaumont Tr. Co.	7	Psr. Cl.	27	City	All	Two
Benton Harbor-St. Joe Ry.	2	Psr. Cl.	39	City	All	Two
Berkshire St. Ry.	4	Psr. Conv.	43	City	Semi	..
Binghamton Ry.	16	Psr. Cl.	31	City	All	Two
Boston & Maine R. R.	2	Loco. 130 ton.	..	..	..	..
Boston Elevated Ry.	42	Psr. Cl.	47	Elev.	Semi	..
	100	Psr. Cl.	49	City	Semi	..
	2	Frt.	39	..	All	..
	10	Psr. Cl.	48	City	Semi	..
	50	Psr. Trail	48	City	Semi	..
	2	Work	47	..	Semi	..
Bristol & Plainville Tr. Co.	3	Psr. Cl.	39	City	Semi	..
Buffalo & Depew Ry.	1	Work	28	..	..	..
Buffalo & Lake Erie Tr. Co.	30	Psr. Cl.	45	City	All	..
	1	Sweeper				
Buffalo, Lockport & Rochester	1	Exp	54	Int.	All	..
Burlington County Tr. Co	2	Psr. Conv.	41	Int.	Semi	..
Burlington Trac. Co.	1	Psr. Cl.	44	City	Semi	..
Butte, Anaconda & Pacific Ry.	6	Locos. 80 ton	..	..	..	..
Butte Elec. Ry.	4	Psr. Open	46	City	Semi	
	5	Psr. Cl.	41	City	All	..
Centralia Trac. Co.	2	Psr. Cl.	32	Both	All	Two
Chambersb'g, G'no'sle & W'boro Ry.	2	Psr. Conv.	47	Int.	Semi	..
	1	Line	34	..	..	..
Charleston Interurban R. R.	2	Psr. Cl.	47	Int.	All	..
	1	Exp	45	..	Semi	..
Chattanooga Trac. Co.	2	Psr. & Bagg.	46	Int.	All	..
Chicago & Interurban Tr. Co.	1	Psr. Cl.	48	Int.	..	..
Chicago, Lake Shore & So. Bend Ry.	2	Locos. 72 tons	..	..	..	..
	18	Frt. Trail	44	..	..	..
Chicago, No. Shore & Mil. R. R.	5	Psr. Cl.	54	Int.	Semi	..
	7	Psr. & Exp.	54	Int.	Semi	..
	3	Dining	54	Int.	Semi	..
Chicago, So. Bend & No. Ind. Ry.	5	Psr. Cl.	38	City	All	..
Chicago Surface Lines	10	Psr. Cl.	48	City	Semi	
Chicago & West Towns Ry.	5	Psr. Cl.	46	City	All	..
Cincinnati, Newport & Cov'gt'n.	25	Psr. Cl.	45	City	All	
	2	Sweeper	28	..	..	..
Cincinnati Traction Co.	100	Psr. Cl.	44	City	Semi	..
Citizens' Ry. Co.	2	Psr. Cl.	30	City	All	One
City Elec. Co., Albuquerque, N. M.	5	Prs Cl	28	City	Semi	One
City Lt. & Tr. Co., Sedalia, Mo.	8	Psr. Cl.	29	City	Semi	One
City Ry., Dayton, O.	10	Psr. Cl.	43	City	All	
Clev. All'nce & M'h'n'g V'y R. R.	2	Psr. Cl.	55	Int.	All	..
	6	Frt. Trail	50	..	Semi	..
Cleveland, Painesv'le & E'st'n R. R.	1	Exp.	50	..	Wood	..
Cleveland Ry Co.	25	Psr. Cl.	51	City	Semi	..
	25	Trail	49	City	Semi	..
	1	Sweeper	..	..	..	..
Cleveland Southw'n & Col. Ry.	6	Psr. Cl.	62	Int.	All	..
Columbus Ry., Lt. & Pr. Co.	5	Psr. Cl.	36	City	Semi	One

Railway	Number	Type	Overall Length	Service	Construction	One-Man
Conestoga Trac. Co	1	Psr. Cl.	43	Sub.	Semi	..
	3	Psr. Cl.	38	City	Semi	..
	1	Frt.	..	..	..	..
Connecticut Co	60	Psr. Conv.	49	City	Semi	..
	30	Psr. Conv.	43	City	Semi	..
	10	Psr. Conv.	46	Both	Semi	..
	1	Psr. Cl.	50	City	Wood	..
	4	Exp.	41	..	Wood	..
	4	Frt. Trail	42	..	Semi	..
	6	Frt. Trail	42	..	Wood	..
	1	Snow Plow	..	..	..	..
	1	Line	42	..	Wood	..
	1	Wrecker	42	..	Wood	..
Connecticut Valley Ry	1	Work	45	..	Wood	..
Corning & Painted Post Ry	4	Psr. Cl.	34	City	All	One
Cumberland County Pr. & Lt. Co	4	Psr. Conv.	36	City	Semi	..
Cumberland & West'p't Elec. Ry	5	Psr. Cl.	45	Int.	All	..
Dayton & Troy Ry	6	Frt.	50	Semi	..	..
Dayton, Springfield & Xenia Ry	2	Psr. Cl.	44	City	All	..
Des Moines City Ry	40	Psr. Cl.	45	City	Semi	..
	1	Loco.	30	..	..	..
	1	Line	40	..	Wood	..
	2	Work	40	..	Semi	..
Detroit United Ry	100	Trail	47	City	All	..
	8	Trail	54	Int.	Semi	..
	50	Psr. Cl.	47	City	All	..
	8	Psr. Cl.	54	Int.	Semi	..
	8	Psr. Cl.	58	Int.	Semi	..
	31	Frt. Trail	50	..	..	..
	30	Frt. Trail	40	..	..	..
	1	Work	48	..	..	..
	3	Line	..	..	..	..
	2	Express	50	..	..	..
Duluth St. Ry	8	Psr. Cl.	47	City	Wood	..
Durham Trac. Co	6	Psr. Cl.	31	City	All	One
	3	Psr. Cl.	26	City	All	One
East St. Louis & Sub'n Ry	50	Psr. Cl.	46	City	Semi	..
	3	Psr. Cl.	54	Int.	All	..
Eastern Pennsylvania Rys	2	Psr. Conv.	47	City	Semi	..
Easton Transit Co	6	Psr. Cl.	42	Int.	All	..
	1	Sweeper	31	..	..	..
Elmira Water, Lt. & R. R	5	Psr. Cl.	45	City	All	..
	3	Work	45	..	..	..
Escanaba Trac. Co	1	Psr. Cl.	34	City	All	One
Evanston Ry	3	Psr. Cl.	42	City	Semi	..
Fonda, Jonhstown & Gl v'le R. R	2	Psr. Cl.	33	City	All	Two
Fort Dodge, Des Moines & S'n R. R	1	Psr. Cl.	43	City	Semi	..
	2	Psr. Cl.	53	Int.	Semi	..
	1	Trail	50	Int.	Semi	..
Fort Wayne & Decatur Trac. Co	3	Psr. Cl.	49	Int.	Semi	..
	1	Exp.	40	..	Wood	..
Fort Wayne & N. Ind. Tr. Co	1	Sweeper	28	..	..	..
Fox & Illinois Union Ry	1	Exp.	50	..	Semi	..
Fresno Trac. Co	6	Psr. Cl.	30	City	Wood	..
Georgia Ry. & Pr. Co	6	Psr. Cl.	44	City	Semi	..
Grand Rapids Ry	15	Psr. Cl.	44	City	Semi	..
Grand Rapids, Grand Haven & Muskegon Ry	1	Psr. Cl.	53	Int.	Semi	..
	3	Exp.	50	..	Semi	..
	3	Exp.	48	..	Wood	..
Great Falls St. Ry	7	Psr. Cl.	40	City	All	..
Hagerstown & Frederick Ry	2	Trail	30	City	Wood	Two
Hammond, Whiting & E. Chi. Ry	4	Psr. Cl.	48	City	Semi	..
Harrisburg Rys	2	Psr. Cl.	44	Both	All	..
	3	Psr. Cl.	37	City	Semi	..
Hocking-Sunday Creek Tr. Co	1	Psr. Cl.	48	Int.	All	..
	1	Psr. Trail	45	Int.	All	..
Holyoke St. Ry	5	Psr. Cl.	42	City	Semi	..
	5	Psr. Cl.	44	City	Semi	..
	1	Sweeper	..	..	..	..
Hudson Valley Ry	3	Psr. Cl.	51	Int.	Wood	..
	1	Work	43	..	..	..
Hutchinson Inter-Urban Co	3	Psr. Cl.	28	City	Semi	One
Hydro-Elect. Pr. Com., Toronto, Can	3	Psr. Cl.	50	Int.	Wood	..
Illinois Northern Utilities Co	1	Psr. Cl.	32	City	Semi	One
Illinois Trac. System	101	Frt. Trail	40	..	..	..
	40	Frt. Trail	42	..	..	..
	60	Frt. Trail	36	..	..	..
	1	Sweeper	..	..	..	..
Indianapolis Trac. & Term. Co	25	Psr. Cl.	47	City	Semi	..
International Ry	20	Psr. Cl.	55	Int.	Semi	..
	7	Psr. Cl.	34	City	Semi	..
	2	Funeral	..	..	..	..
Ironwood & Bessemer Ry	3	Psr. Cl.	28	City	Semi	One
Ithaca Trac. Corporation	1	Sweeper	28	..	..	..
Jackson (Miss.) Lt. & Trac. Co	2	Psr. Cl.	26	City	All	One
Jackson (Tenn.) Ry. & Lt. Co	2	Psr. Cl.	30	City	All	One
Jamestown St. Ry. Co.	10	Psr. Cl.	42	City	All	..
Jamestown, Westfield & Nor. R. R	3	Psr. Cl.	62	Int.	All	..
	1	Psr. Trail	62	Int.	All	..
Jersey Central Trac. Co	3	Psr. Cl.	33	City	All	One
Johnstown Trac. Co	10	Psr. Cl.	40	City	Semi	..
Joplin & Pittsburgh Ry. Co	1	Exp.	45	..	Wood	..
Kankakee & Urbana Trac. Co	1	Exp.	51	..	Wood	..
	7	Frt.	36	..	Wood	..
Kankakee Elec. Ry	2	Psr. Cl.	27	City	Semi	One
Kansas City Rys	75	Psr. Cl.	44	City	Semi	..
Kansas City, Clay Co., & St. Jo. Ry	1	Loco.	..	..	..	..
Kansas City, Kaw Valley & W'n Ry	2	Locos.	..	..	..	..
Keokuk Elec. Co	1	Psr. Cl.	28	City	Semi	One
Lake Shore Elec. Ry	12	Psr. Cl.	60	Int.	All	..
	2	Exp.	..	..	All	..
Lehigh Valley Transit Co	12	Psr. Cl.	50	Both	All	..
Levis County Ry	2	Psr. Cl.	32	City	Semi	Both
Lewisburg & Ronceverte Ry	1	Psr. Cl.	39	Int.	All	..
Lewiston, Augusta & W'v'le St. Ry	2	Exp.	41	..	Semi	..
	1	Snow Plow	..	..	..	..
Lewiston-Clarkston Transit Co	3	Psr. Clad	28	City	Semi	One
London & Port Stanley Ry	2	Psr. Cl.	71	Int.	All	..
Long Island R. R	45	Psr. Trail	54	Int.	All	..
Lorain St. Ry	5	Psr. Cl.	50	City	All	..
Macon Ry. & Lt. Co	6	Psr. Cl.	30	City	Wood	..
Madison Rys	5	Psr. Cl.	33	City	Semi	..
Mahoning & Shenango Ry	10	Psr. Cl.	47	City	All	..
	10	Psr. Cl.	28	City	All	One
	4	Frt.	43	..	Semi	..
	1	Line	43	..	Semi	..
Manhattan & Queens Tr. Co	7	Psr. Cl.	43	City	All	..
	1	Sweeper	..	..	..	..
Massachusetts No'east'n Tr. Co	12	Psr. Conv.	42	Int.	Semi	..
Memphis & Rugby Ry	1	Psr. Cl.	27	City	Wood	..
Miami Tr. Co	2	St. Batt.	26	City	Wood	Two
Michigan Railway	2	Psr.Cl.	53	Int.	All	..
	8	Psr. Trail	53	Int.	All	..
	2	Express	..	..	All	..
	4	Psr. Cl.	61	Int.	All	..
	20	Psr. Cl.	40	City	Semi	..
Michigan United Rys	20	Psr. Cl.	41	City	Semi	..
Milwaukee Elec. Ry. & Lt. Co	50	Psr. Cl.	50	City	All	..
	1	Sweeper	..	..	..	..
Mississippi Valley Elect. Co	4	Psr. Cl.	26	City	Semi	One
Moline, Rock Island & E'st'n Tr. Co	1	Sweeper	..	..	..	..
Monongahela Valley Tr. Co	8	Psr. Cl.	29	City	Semi	Two
Monroe St. Ry	3	Psr. Cl.	29	City	Semi	One
Montgomery Lt. & Tr. Co	6	Psr. Cl.	31	City	All	Two
Montgomery Transit Co	3	Psr. Cl.	35	City	All	Both
Morris County Tr. Co	5	Psr. Cl.	48	Int.	All	..
	1	Sweeper	..	..	..	..
Municipal Ry., Alexandria, La	2	Psr. Cl.	32	City	All	Two
Murphysboro Elec. Ry	2	Psr. Cl.	43	Int.	All	..
Muskegon Tr. & Lt. Co	4	Psr. Cl.	45	City	All	..
Nashville (Tenn.) Int. Ry	1	Express	46	..	Semi	..
Nashville (Tenn.) Ry. & Lt	9	Psr. Cl.	42	City	..	..
New Bedford & Onset St. Ry	1	Line	..	..	..	..
New Jersey & Penna. Tr. Co	1	Baggage	23	..	..	..
Newport News & Hampton Ry	4	Psr. Cl.	35	City	All	Two
New York Central R. R	12	Psr. Cl.	70	Int.	All	..
	10	Locos. 100 ton	..	..	..	..
New York Municipal Ry	200	Psr. Cl.	67	Sbwy.	All	..
New York Railways	70	St. Batt.	29	City	Semi	Two
New York State Rys. (Rochester)	50	Psr. Cl.	50	City	All	..
	3	Dump	..	..	..	..
New York State Rys. (Syracuse)	25	Psr. Cl.	48	City	All	..
	1	Snow Plow	..	..	..	..
New York State Rys. (Utica)	12	Psr. Cl.	50	Int.	All	..
	10	Psr. Cl.	48	City	All	..
Niagara Junction Ry	1	Loco. 60 ton	..	..	..	..
North Carolina Pub. Serv. Co	6	Psr. Conv.	27	City	Semi	One
Northern Massachusetts St. Ry	1	Work	30	..	Wood	..
Northern Ohio Tr. & Lt. Co	15	Psr. Cl.	53	Int.	All	..
	25	Psr. Cl.	50	City	Semi	Two
	1	Express	60	..	Semi	..
Northern Texas Tr. Co	10	Psr. Cl.	28	City	Semi	One
Ogden, Logan & Idaho	3	Psr. Cl.	65	Int.	All	..
	3	Loco. 50-ton	..	..	..	..
	1	Loco. 30-ton	..	..	..	..
Oakwood St. Ry	5	Psr. Cl.	45	City	Semi	..
Ohio Elect. Ry	10	Frt. Trail	39	..	Wood	..
Ohio River Pass'g'r Ry	2	Psr. Trail	47	Int.	All	..
Oklahoma Ry	4	Psr. Cl.	56	Int.	All	..
	6	Psr. Cl.	44	City	Semi	..
	2	Exp. Trail	42	..	Wood	..
Omaha & Council Bluffs Ry	25	Psr. Cl.	42	City	Wood	..
Oshawa Ry	1	Loco.	23	..	..	..
Oskaloosa Tr. & Lt. Co	6	Psr. Cl.	30	City	All	One
Ottumwa Ry. & Lt. Co	5	Psr. Cl.	31	City	All	Both
Pekin Municipal St. Ry	2	Psr. Cl.	31	City	All	One
Pennsylvania R. R. (Elec. Div'n)	1	Sweeper	..	..	..	..
Peoples' Ry. of Dayton, O	10	Psr. Cl.	44	City	Semi	..
	10	Psr. Trail	42	..	Semi	..
	10	Psr. Trail	44	..	All	..
Piedmont & Northern	1	Psr. Cl.	27	City	..	One
Piedmont Ry. & Elect. Co	2	Psr. Cl.	26	City	All	One
Pittsburgh Rys	162	Psr. Cl.	45	City	All	..
	75	Psr. Trail	45	Ctiy	All	..
	4	Dump	..	..	..	..
Portsmouth Elect. Ry	1	Work	34	..	..	..
Pottstown & Phoenixville Ry	8	Psr. Conv.	52	Int.	All	..
Princeton Power Co	2	Psr. Cl.	43	Int.	All	..
Public Service R. R., Trenton	5	Psr. Cl.	47	Int.	Semi	..
Public Service Ry., Newark	127	Psr. Open	49	City	Semi	..
	50	Psr. Cl.	52	City	Semi	..
	20	Psr. Cl.	47	Int.	Semi	..
	10	Sweepers	28	..	..	..
Public Utilities Co	10	Psr. Cl.	41	City	Semi	..
	1	Frt.	34	..	..	..
Puget Sound Tr., Lt. & Pr. Co	1	Psr. Cl.	23	City	All	One
	8	Psr. Cl.	28	City	All	One
Quebec Ry., Lt. & Pr. Co	4	Psr. Cl.	40	City	Semi	..
	1	Sweeper	..	..	..	..
Reading Tr. & Lt. Co	15	Psr. Conv.	46	Int.	Semi	..
	13	Psr. Conv.	32	City	Semi	Both
	1	Dump	..	..	..	..
Regina Municipal Ry	1	Snow Plow	29	..	..	..
Rhode Island Co	50	Psr. Cl.	42	City	Semi	..
	7	Express	41	..	Wood	..
Richmond Lt. & R. R. Co	1	Dump	..	..	..	..
Rockland, Thomaston & Camden	1	Psr. Cl.	42	Int.	Semi	..
Rutland Ry., Lt. & Pr	1	Psr. Cl.	29	City	All	Two
St. Cloud Pub. Serv. Co	2	Psr. Cl.	34	City	Semi	One
Salem & Penns Grove	1	Express	28	..	Wood	..
Salt Lake & Ogden Ry	6	Psr. Trail	62	Int.	Semi	..
Salt Lake & Utah R. R	6	Psr. Cl.	61	Int.	All	..
	2	Locos. 50-ton	..	..	..	..
San Antonio Tr. Co	30	Psr. Cl.	35	City	All	Both
Sand Springs Ry	2	Psr. Cl.	58	Int.	All	..
	3	Frt. Trail	..	..	..	..
Sandwich, Windsor & Am'b'g Ry	2	Psr. Cl.	43	Int.	All	..
	2	Psr. Cl.	34	City	Wood	..
San Francisco–Oakland Term. Ry	20	Psr. Cl.	41	City	All	..
	12	Psr. Cl.	51	Int.	All	..
Schenectady Ry	6	Psr. Cl.	50	Int.	All	..
	10	Psr. Cl.	50	City	All	..
Schuylkill Ry	2	Psr. Cl.	37	City	Semi	..
	4	Psr. Cl.	42	City	Semi	..
Scranton & Binghamton Ry	2	Express	40	..	Wood	..
	1	Coal	40	..	..	..

Railway	Number	Type	Overall Length	Service	Construction	One-Man
Scranton Ry	10	Pas. Cl.	46	City	Semi	..
Shore Line Elec. Ry	2	Frt. Trail	44	..	..	..
Sioux City Service Co.	10	Pas. Cl.	39	City	Wood	..
Sioux Falls Tr. System	1	Pas. Cl.	30	City	Semi	Both
Slate Belt Elect. St. Ry	1	Frt.	50	..	..	..
Southern Cambria Ry. Co.	2	Pas. Cl.	50	Int.	Wood	..
Southern Penna. Tr. Co.	3	Pas. Conv.	41	City	Semi	..
Southern Pub. Utilities Co.	6	Pas. Cl.	38	City	All	..
	6	Pas. Cl.	27	City	..	One
Southwest Missouri R. R.	5	Pas. Cl.	44	Int.	Semi	..
Southwestern Interurban Ry.	1	Pas. Cl.	28	City	All	Two
Springfield & Washington Ry.	1	Pas. Cl.	49	Int.	All	..
Springfield (Ill.) Consol. St. Ry.	7	Pas. Cl.	45	City	Semi	..
Springfield (Vt.) Elect. Ry. Co.	1	Snow Plow	..	..	..	..
Springfield (Mass.) St. Ry.	10	Pas. Conv.	43	City	Semi	..
	1	Express	45	..	Semi	..
Springfield (O.), Troy & Piqua Ry.	1	Express	51	Int.	Semi	..
	1	Exp. Trail	45	Int.	Semi	..
Stark Elec. R. R.	2	Pas. Cl.	55	Int.	All	..
	3	Pas. Cl.	43	City	All	..
Steubenville & East L'p'l Ry.	5	Pas. Trail	47	City	All	..
Steubenville Ry.	3	Pas. Cl.	44	Int.	All	..
Stroudsburg P's'g'r Ry.	1	Pas. Conv.	31	City	Wood	Two
Tazewell St. Ry.	1	Pas. Cl.	31	City	Semi	Two
Third Avenue Ry.	1	Dump	..	..	..	..
Tidewater Pr. Co.	2	Pas. Cl.	31	City	Semi	One
Tiffin, Fostoria & East'n Ry.	1	Pas. Cl.	55	Int.	All	..
Toledo, Bowl'g Green & S'n Tr. Co.	1	Pas. Cl.	45	Int.	All	..
	2	Express	55	..	All	..
Toledo, Fostoria & F'dl'y Ry.	1	Pas. Cl.	..	City	All	..
Toledo Rys. & Lt. Co.	60	Pas. Cl.	50	City	All	..
Toronto Civic Ry.	13	Pas. Cl.	47	City	Semi	..
Toronto Ry. Co.	25	Pas. Conv.	..	City	..	..
Toronto Suburban St. Ry.	2	Pas. Cl.	50	City	Wood	..
Towson & Cockeysville El. Ry.	1	St. Batt.	26	City	Wood	One
Tri-City Rg of Illinois	3	Pas. Cl.	42	City	Semi	..
Tri-City Ry. of Iowa	10	Pas. Cl.	37	City	All	..
	1	Dump	..	..	..	..
Twin City Rapid Tr. Co.	63	Pas. Cl.	47	City	Semi	..
Union Depot Bridge & Term. Co.	5	Pas. Cl.	30	City	All	One
Union St. Ry., New Bedford, Mass.	12	Pas. Cl.	44	City	All	..
Union Tr. Co. of Coffeyville, Kan.	1	Loco.	..	..	..	..
Union Tr. Co. of Indiana	1	Sweeper	..	..	..	..
United Rys. & Elect. Co.	100	Pas. Cl.	44	City	Wood	..
United Rys. of St. Louis	4	Sweeper	40	..	..	..
United Traction Co.	10	Pas. Cl.	33	City	Semi	..
Valley Railways	4	Pas. Cl.	40	City	Semi	..
Vicksburg Lt. & Tr. Co.	1	Pas. Cl.	33	City	All	Both
Virginia Ry. & Pr. Co.	1	Pas. Cl.	45	Int.	All	..
	3	Pas. Trail	45	Int.	All	..
Visalia Electric Co.	1	Pas. Cl.	72	Int.	Semi	..
Warren St. Ry.	1	Pas. Cl.	47	City	Semi	..
Washington & Maryland Ry.	1	Pas. Cl.	25	City	Semi	Both
Waterbury & Milldale Tr'w'y.	2	Pas. Conv.	31	Int.	Semi	Two
Waverly, Sayre & Athens Tr. Co.	1	Pas. Cl.	47	City	Wood	..
West Chester St. Ry. Co.	2	Pas. Cl.	45	Int.	All	..
West Penn Rys.	6	Pas. Cl.	58	Int.	Semi	..
	1	Express	45	..	Wood	..
	1	Sweeper	..	..	..	..
West Virginia Tr. Co.	1	Express	..	..	Wood	..
Western Lt. & Pr. Co.	3	Pas. Cl.	28	City	All	Both
Wheeling Tr. Co.	8	Pas. Cl.	45	City	All	..
Wichita Falls Tr. Co.	5	Pas. Cl.	2	City	Semi	One
Wichita R. R. & Lt. Co.	15	Pas. Cl.	30	City	All	One
Wisconsin Ry., Lt. & Pr. Co.	4	Pas. Cl.	31	City	Semi	One
	7	Pas. Cl.	43	City	Semi	..
Worcester Consol. St. Ry.	11	Pas. Cl.	44	City	Semi	..
	3	Express	45	..	Semi	..
	3	Snow Plows	..	..	..	..
York Railways	6	Pas. Cl.	35	City	All	Two
	1	Dump	..	..	..	..

Electric Railway Statistics

Figures Are Given by States of the Miles of Track and Number of Cars Owned

THE accompanying table gives statistics of the miles of track and cars of the electric railway companies in the United States, made up from the August, 1916. *Electric Railway Directory* of the McGraw Publishing Company. The dates of the reports in this directory average about June, 1916, so that the table may be considered to represent the statistics of the industry at about that time.

A comparison of the totals given in this table with those in a somewhat similar table published in the issue of Jan. 22, 1916, will show for all states a total of 47,562 miles as compared with a total of 46,454 miles last year, and 100,476 cars as compared with 99,405 last year. A comparison by states, however, will show some decreases in both cars and miles of track, while in the case of other states, there are increases of considerable magnitude. This condition, to which attention was directed last year, may be accounted for, in part, by the seeming inevitable discrepancies which occur when reports are made out by different officials each year, in part to differences in the methods of classifying cars, and in part to more exact information as to the portions of interstate railways which are located in two or more states.

A few other words of explanation are necessary. The electrified mileage of steam railroads is included in all cases, but under cars only the electric locomotives and the electric motor cars on such roads are given. That is to say, in such cases, trail cars and service cars have not been included. Gasoline motor passenger cars are included in the column of motor passenger cars, but in most cases the miles of track over which the gasoline motor cars operate have been omitted from the mileage column as these tracks are used very largely for steam freight trains and it has been the intention to make the table primarily one of city and interurban passenger properties. In a few cases, where a company owns a large number of service cars compared with the number of passenger cars owned, the total number of such service cars has been intentionally omitted from the table.

TABLE SHOWING STATISTICS OF ELECTRIC RAILWAY COMPANIES IN THE UNITED STATES

	Number of Companies	Miles of Track	Motor Passenger Cars	Trail Passenger Cars	Electric Locomotives	Express Motor Cars	Freight Cars	Service and Other Cars	Cable and Horse Cars
New England States:									
Connecticut	12	1,592	2,160	44	100	....	....	67	
Maine	16	580	589	....	3	3	56	149	6
Massachusetts	43	3,245	7,922	236	3	23	37	1,144	....
New Hampshire	13	210	266	....	1	....	2	29	2
Rhode Island	3	438	1,051	47	....	....	....	259	
Vermont	10	125	142	....	....	....	3	17	
Total	97	6,190	12,130	327	107	26	98	1,665	8
Eastern States:									
Delaware	2	153	309	....	....	....	....	80	
District of Columbia	7	412	1,078	....	....	....	....	433	....
Maryland	11	675	2,155	....	10	....	3	218	....
New Jersey	29	1,538	2,810	2	2	13	....	53	....
New York	110	5,477	16,559	1,124	138	11	35	2,161	203
Pennsylvania	128	4,477	8,575	16	2	6	78	602	1
Virginia	17	602	921	25	..	....	....	179	
West Virginia	25	633	641	....	12	....	3	43	
Total	329	13,967	33,048	1,167	164	30	119	3,769	204
Central States:									
Illinois	72	3,760	5,922	697	51	....	962	627	
Indiana	44	2,304	1,923	....	1	7	3	256	
Iowa	27	868	965	13	19	....	....	365	
Kentucky	9	462	992	26	....	....	21	58	
Michigan	25	1,676	2,272	8	20	102	13	473	
Minnesota	14	715	1,250	8	8	....	....	287	
Missouri	22	1,113	2,514	6	..	....	....	459	
Ohio	80	4,300	5,512	76	11	6	28	1,309	2
Wisconsin	21	768	875	142	....	....	3	60	
Total	314	15,966	22,225	976	110	115	1,030	3,894	2
Southern States:									
Alabama	15	365	437	34	....	....	2	210	.
Arkansas	11	134	237	....	....	....	....	54	..
Florida	9	193	248	....	....	....	....	59	....
Georgia	17	485	691	5	..	....	....	88	2
Louisiana	10	328	680	....	..	....	....	140	....
Mississippi	11	123	159	2	.	....	....	27	....
North Carolina	13	289	301	....	6	....	2	217	....
South Carolina	7	113	156	6	....	....	2	19	....
Tennessee	14	461	835	..	1	....	3	147	
Total	107	2,491	3,744	47	7	....	9	961	2
Western States:									
Arizona	4	52	45	1	..	....	....	1	..
California	42	3,232	3,674	81	69	12	338	1,746	109
Colorado	13	459	414	157	...	....	....	259	2
Idaho	6	180	68	....	....	....	....	19	
Kansas	20	527	391	3	....	....	12	112	3
Montana	9	647	110	20	35	....	....	19	.
Nebraska	6	254	538	10	1	....		65	..
Nevada	2	10	12	....	..	..	..	..	..
New Mexico	2	9	11	....	....	....	....	....	
North Dakota	6	38	77	4	....	....	....	14	.
Oklahoma	15	301	242	7	..	..	..	100	.
Oregon	10	733	799	47	19	3	146	548	..
South Dakota	3	26	28	2	..	..	..	5	..
Texas	40	977	1,188	78	..	14	3	186	....
Utah	5	425	275	6	....	1	2	262	....
Washington	13	1,056	1,027	24	27	819	29	110	45
Wyoming	2	22	12	7	..	....	..	3	..
Total	198	8,948	8,911	443	151	849	530	3,449	159
Total, all States	1,045	47,562	80,058	2,960	539	1,020	1,786	13,738	375

New Electric Railway Track Built in 1916

Reports Received from the Various Electric Railway Companies of the United States and Canada Show That Approximately 700 Miles of New Track Were Constructed or Electrified During the Year—A Marked Decrease from Previous Years

THE single-track mileage of new line built or electrified and placed in operation during the year 1916 by the electric railways of the United States and Canada is tabulated in the accompanying lists. The data for these records have been compiled from reports received from practically every electric railway in the United States and Canada and represent 98 per cent of the total operated mileage.

The total new mileage for the year, amounting to 744.3, is materially less than the total of any previous year for which record has been kept. This condition is shown in the following table, which contains the statistics obtained in previous years since 1907, but note should be made of the fact that by far the greater part of the decrease has been a loss in new electric railway track, since the electrified steam railroad mileage of 388 is not an exceptional decrease from the high corresponding figure of last year. Thus it becomes increasingly evident that the two classes of electric railway mileage display wholly independent tendencies and should be considered separately.

Of the 356.3 miles of new electric railway track that has been built during the past year, about two-thirds may be classed as interurban—only a slightly larger ratio than that which existed last year. A tendency toward an evenly-distributed loss in new construction appears also in the fact that although the decrease from last year on a mileage basis is practically 50 per cent, it is only 25 per cent on the basis of states represented and a loss of only 33 per cent on the basis of the number of companies appearing in the record. In other words, the average company cut down on its new construction and relatively few gave up new work altogether. The same thing is evidenced by the fact that, in only one case was there any considerable stretch of new track put down in any particular locality, the maximum mileage built in one State being 78.4 if the electrified steam road mileage of Montana is included.

The State in question is California, whose leading position in new track construction is due to considerable extension of four of the numerous interurban railways characteristic of the west coast. Illinois ranks second in the list, with approximately 33 miles of new track, of which 25 miles were constructed by the Chicago Surface Lines—the largest extension of strictly city tracks reported for the year. In this connection it may be said that Canada appears to have maintained track extensions to a rather surprising degree in view of the European war, since no less than ten electric railways are represented with 9 miles of new track exclusive of the 53-mile electrification of the Lake Erie & Northern.

This 53 miles of the Lake Erie & Northern is included in the total of 388 miles of electrified steam railroad track, but the major part of the steam railroad track equipped for electric operation is contributed by the Chicago, Milwaukee & St. Paul installation extending across the Rocky Mountains. This project includes four engine divisions, of which one was placed in service in 1915 and two during the past year. The remaining division will be completed early in 1917.

	New Electric Railway Track Built	Electrified Steam Line	Total New Electric Mileage
1907	....	....	1880.0
1908	1174.5	84.0	1258.5
1909	774.7	112.4	887.1
1910	1204.8	192.4	1397.2
1911	1105.0	86.5	1191.5
1912	869.4	80.8	950.2
1913	974.9	119.0	1093.9
1914	716.5	229.0	946.4
1915	596.0	448.2	1044.2
1916	356.3	388.0	744.3

ALABAMA

	Miles.
Mobile, Volanta & Pensacola R. R.	1.0
	1.0

CALIFORNIA

Fresno Interurban Ry.	15.0
Oakland, Antioch & Eastern Ry.	1.4
Pacific Electric Ry.	16.3
San Diego Electric Ry.	2.2
South San Francisco R. R. & Power Co.	0.5
Tide Water Southern Ry—Modesto to Turlock	17.0
Visalia Electric R. R. Co.—Exeter to Strathmore to Lindsay 21.5 miles. Southeast to Portersville 4.5 miles	26.0
	78.4

CONNECTICUT

Connecticut Co.	7.3
Lordship Co., Bridgeport, Conn.	0.25
	7.55

DISTRICT OF COLUMBIA

Capital Trac. Co.	0.1
	0.1

FLORIDA

St. Petersburg & Gulf Ry.	1.5
	1.5

GEORGIA

Georgia Ry. & Power Co.	4.5
	4.5

HAWAII

Honolulu Rapid Transit & Land Co.	0.2
	0.2

ILLINOIS

Bloomington, Pontiac & Joliet Ry. Co.	0.5
Centralia & Central City Trac. Co.	0.2
Chicago Heights St. Ry.	0.75
Chicago, Ottawa & Peoria	0.3
Chicago Heights St. Ry.	0.7
Decatur Ry. & Light Co.	0.5
Joliet & Eastern Trac. Co.	0.1
Kankakee & Urbana Trac. Co.—Connects Ludlow and Paxton	5.0
Springfield Consolidated Ry. Co.	0.5
Tri-City Ry. Co. of Illinois	0.4
	33.2

INDIANA

Chicago Lake Shore & South Bend Ry.	2.3
Interstate Public Service Co.	0.5
	2.8

IOWA

Des Moines City Ry.	3.1
Fort Dodge, Des Moines & Southern R. R. Co.—Swanwood Junction to Des Moines	4.5
Fort Madison St. Ry. Co.	0.3
Inter-Urban Ry. Co.	2.6
Keokuk Electric Co.	0.3
Tri-City Ry. Co. of Iowa	0.8
	11.6

KANSAS

Salina St. Ry. Co.	0.1
Topeka Rys.	0.5
Hutchinson Inter-Urban Ry. Co.	1.1
	1.7

KENTUCKY

Louisville Ry. Co.	4.0
Southern Traction Co., Inc.	0.25
	4.25

LOUISIANA

New Orleans Ry. & Lt. Co.	0.9
	0.9

MARYLAND

United Rys. & Electric Co.	5.5
	5.5

MASSACHUSETTS	Miles.
Boston Elevated Ry. Co	4.5
Springfield St. Ry. Co	1.5
Union St. Ry. Co	0.5
	6.5
MICHIGAN	
Detroit United Ry. Co	23.9
Escanaba Traction Co	0.3
Grand Rapids Ry. Co	0.5
	24.7
MINNESOTA	
Duluth St. Ry. Co	5.4
Twin-City Rapid Transit Co	3.0
	8.4
MISSOURI	
Kansas City Rys. Co	9.3
United Rys. of St. Louis	1.1
	10.4
MONTANA	
Butte Electric Ry	2.5
Chicago, Milwaukee & St. Paul Ry.—Electrification. Between Three Forks and Harlowton 114 miles of main track; 54.5 miles of side track and yards. Between Deer Lodge and Alberton, 111 miles of main track; 53.0 miles of side track and yards	332.5
Missoula St. Ry. Co	1.5
	336.5
NEW JERSEY	
Public Service Ry. Co	1.2
	1.2
NEW YORK	
Brooklyn Rapid Transit Co	6.0
Buffalo & Lake Erie Trac. Co	0.9
International Ry. Co	0.5
Manhattan & Queens Trac. Corporation	2.7
New York State Rys.—Syracuse Lines	0.2
Third Ave. Ry	1.6
	11.9
NORTH CAROLINA	
Goldsboro Electric Ry	1.5
Piedmont & Northern Ry	3.5
Southern Public Utilities Co	2.0
	7.0
OHIO	
Cleveland Ry. Co	3.0
Mahoning & Shenango Ry. & Light Co	3.0
Portsmouth St. R. R. & Light Co.—Between Wheelersburg and Hanging Rock	21.0
Toledo Rys. & Light Co	0.6
	27.6
OKLAHOMA	
Ardmore Ry. Co	1.25
Oklahoma Ry. Co.—Edmond to Guthrie	16.0
Tulsa St. Ry. Co	1.0
	18.25
PENNSYLVANIA	
Allen St. Ry. Co	0.3
Chester & Eddystone St. Ry. Co	1.9
Eastern Pennsylvania Rys. Co.—Pottsville to St. Clair	2.0
Lehigh Trac. Co	0.3
Northwestern Pennsylvania Ry. Co—Venango to Cambridge Springs	3.6
Philadelphia Rapid Transit Co	0.9
Philadelphia & West Chester Trac. Co	1.0
Pottstown & Phoenixville Ry. Co	4.0
Reading Transit & Light Co	1.0
Scranton & Binghamton R. R. Co.—Brooklyn to Montrose	10.0
	25.0
RHODE ISLAND	
Rhode Island Co	0.6
	0.6
SOUTH DAKOTA	
Sioux Falls Trac. System	0.5
	0.5
TENNESSEE	
Chattanooga Trac. Co.—Valley Junction to Red Bank, 5 miles, and C. & D. Junction to C. N. O. & H. Ry., 5 miles	10.0
Jackson Ry. & Light Co	3.0
	13.0
TEXAS	
Beaumont Trac. Co	0.7
	0.7
WASHINGTON	
Lewiston-Clarkston Transit Co	2.0
Walla Walla Valley Ry. Co	0.25
	2.25
WEST VIRGINIA	
Appalachian Power Co	1.7
Charleston Interurban R. R. Co.—Marmet to Cabin Creek Junction	6.5
Norfolk & Western Ry. Co. (Elec. Div.).—Electrification of branch line to Pocahontas, Va	2.5
Princeton Power Co.—Interurban through New Hope and Billie	12.0
	22.7
WISCONSIN	
Chicago, Harvard & Geneva Lake Ry	0.6
Madison Rys. Co	1.0
	1.6
WYOMING	
Cheyenne Electric Ry. Co	0.25
	0.25
CANADA	
Calgary Municipal Ry	3.5
Lake Erie & Northern Ry.—Electrification from Galt to Paris, Brantford, Waterford, Simcoe and Port Dover	53.0
London St. Ry. Co	0.8
Montreal & Southern Counties Ry.—Abbotsford to City of Granby	8.5
Port Arthur Civic Ry. Co	1.1
Quebec Ry., Light & Power Co	0.5
Reginia Municipal Ry	1.4
Sandwich, Windsor & Amherstburg Ry	0.8
Sarnia St. Ry. Co	0.5
Toronto Civic Railway	1.2
Toronto Ry. Co	0.75
	72.05

AMERICAN ASSOCIATION NEWS

Boston Meeting Program

Supplementing the statement made in the issue for Dec. 16, the following brings the information regarding the mid-year meeting program up to date:

a. General business.
b. Report of committee on social relations:
   1. Minimum wage,
   2. Old-age pensions,
   3. Employees' thrift.
c. Prepared discussion by E. E. Rice.
d. Paper on "Wage Arbitration and Contracts," by Bentley Warren, Boston, Mass.
e. Paper on "Salesmanship in the Electric Railway Business," by Robert Frothingham, New York City.

Power Distribution

The Engineering Association committee on power distribution met in Chicago, Ill., on Jan. 3, 4 and 5. The committee devoted its combined efforts to revision of the specifications for line construction and line materials. As this issue of the paper goes to press a telegram announces that Friday evening was to be spent by the committee in an inspection of one of the automatic substations of the Elgin & Belvidere Electric Railway as guests of E. S. Gillette, electrical engineer Aurora, Elgin & Chicago Railroad.

The Chicago meeting was attended by the following committee members: C. L. Cadle, Rochester, N. Y., chairman; R. H. Rice, Chicago, Ill.; E. J. Blair, Chicago, Ill.; C. R. Harte, New Haven, Conn.; E. S. Gillette, Aurora, Ill.; C. E. Fritts, Kansas City, Mo.; J. H. Libbey, Boston, Mass., and A. Schlessinger, Indianapolis, Ind. C. C. Beck, commercial engineer Ohio Brass Company, was also present by invitation, for the purpose of representing the line material section of the Associated Manufacturers of Electrical Supplies.

Training of Transportation Employees

The Transportation & Traffic Association committee on the above subject met in Chicago, Ill., on Jan. 3 and 4 and finished the task of co-ordinating the work of previous committees. In attendance were G. T. Seely, Chicago, chairman; H. B. Flower, Baltimore, Md.; C. W. Kellogg, Keokuk, Iowa; J. E. Gibson, Kansas City, Mo., and W. A. Carson, Evansville, Ind.

H. J. Kenfield has been appointed chairman of the transportation sub-committee in charge of the Illinois-Wisconsin district.

Receiverships and Foreclosure Sales

Mileage Placed in Receivers' Hands During 1916 Was Next to Smallest in Last Eight Years —Mortality Rate Through Foreclosure About the Average

THE record of electric railway receiverships for 1916 is considerably better than that for many of the years preceding. In fact, the number of companies, or fourteen, whose finances in 1916 became involved to the point of receivership, was the smallest in the last eight years with the exception of eleven in 1910 and ten in 1914, while the mileage concerned was in the low group and the least with the exception of that in 1913. The showing made in 1916 was especially in contrast to that in 1915, the fourteen railways involved in the last year having a mileage of 351.06 and a capitalization of $24,988,800, as compared to a mileage of 1152.10 and a capitalization of $79,670,425 for the twenty-seven lines in 1915. The receiverships for the last eight years compare as follows:

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1152.10	40,298,050	39,372,375
1916	14	351.06	14,264,600	10,724,200

The accompanying table gives the details of electric railway receiverships in the last calendar year. An attempt was made at all times to take the figures from the most up-to-date and most authoritative sources, and to sift out the correct data in many cases where there were a surprising number of conflicting statements in the financial manuals, particularly with reference to the smaller companies. These, it will be noted, constituted the majority of the railways placed in receivership, only three having more than 50 miles of track.

Most of the receiverships were evidently caused by accumulated financial burdens due to rising costs, operation in poor territory or inherent weakness of organization, but in a few cases there were special reasons. For example, the chief cause of the financial troubles of the Monmouth County Electric Company was the competition of jitneys. A receiver was appointed for the Cincinnati, Dayton & Toledo Traction Company to take the place of a bondholders' protective committee in collecting the rentals of its property from the lessee, the Ohio Electric Railway, which desired a second modification of the lease on account of losses thereunder.

The number of electric railways sold at foreclosure in 1916 was nineteen, the same as in the preceding year. Although the mileage was greater, owing to the resale of the Chicago & Milwaukee Electric Railroad property after the cancelled sale of 1912, the general record was not far from the average for the last eight years. The following table shows the complete comparative figures for this period:

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1909	21	488.00	$22,265,700	$21,174,000
1910	22	724.36	19,106,613	26,374,065
1911	25	660.72	91,354,800	115,092,750
1912	18	267.18	14,197,300	10,685,250
1913	17	302.28	15,243,700	19,094,500
1914	11	181.26	26,239,700	44,094,241
1915	19	308.31	30,508,817	16,759,997
1916	19	431.35	13,655,400	22,542,300

The detailed foreclosure sales are published in the accompanying table. As in preceding years, some electric railways for which receivers had been appointed or against which foreclosure suits had been brought were able to effect reorganization without public sale or have the case dismissed by the court. All the various forms of reorganization, readjustment and change in ownership without formal foreclosure sale were omitted in compiling the table. In passing, however, it might well be noted that the 1915 receivership of the Des Moines City Railway was dissolved without sale after the settlement of the franchise question, and the 1915 receiver of the Kansas City, Clay County & St. Joseph Railway, appointed to protect a judgment for $1,500,000 to the Interstate Railway for the taking of right-of-way on which it held options, was removed in 1916 after the perfection of a satisfactory bond pending final decision on the appeal of the damage case.

In the majority of cases the foreclosure sales in 1916 were the last step prior to the beginning of business through a reorganized company or an entirely new one. For some lines, however, such sales meant a complete cessation of operation and dismantlement. The Mount Vernon Railway, the Lima & Honeoye Light & Railroad Company, the Mountain Railway and half of the Lake Erie, Bowling Green & Napoleon Railway suffered such a fate, and according to reports the Lancaster & Southern Street Railway was destined also to be junked.

ELECTRIC RAILWAY RECEIVERSHIPS IN 1916

	Mileage	Outstanding Stock	Outstanding Funded Debt
Algiers Railway & Lighting Company	6.00	$430,000	$35,000
Boise Railroad, Ltd.	8.00	510,400	389,000
Bristol Traction Company	15.30	143,800	192,500
Cape May, Delaware Bay & Sewell's Point Railroad	20.00	150,000	150,000
Cincinnati, Dayton & Toledo Traction Company	83.90	2,250,000	5,000,000
City Railway, Mt. Vernon, Ill.	3.25	40,000	.....
Gary, Hobart & Eastern Traction Company	9.00	125,000	125,000
Lancaster & Southern Street Railway	7.35	100,000	109,000
Lancaster & York Furnace Street Railway	12.50	170,400	150,000
Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company	56.00	8,331,000	1,000,000
Monmouth County Electric Company	17.71	325,000	500,000
Nashville-Gallatin Interurban Railway	27.05	750,000	600,000
Southwestern Traction Company	15.00	189,000	130,000
Winona Interurban Railway	70.00	750,000	2,343,700
Totals	351.06	$14,264,600	$10,724,200

ELECTRIC RAILWAY FORECLOSURE SALES IN 1916

	Mileage	Outstanding Stock	Outstanding Funded Debt
Ardmore Electric Railway	4.70	$200,000*	.....
Chicago & Milwaukee Electric Railroad	160.00	5,000,000	$16,225,000
Choctow Railway & Lighting Company	23.26	2,000,000	1,144,000
Lake Erie, Bowling Green & Napoleon Railway	24.50	678,400	428,500
Lancaster & Southern Street Railway	7.35	100,000	109,000
Lancaster & York Furnace Street Railway	12.50	170,400	150,000
Lima & Honeoye Light & Railroad Company	4.60	5,000	.....
Lykens & Williams Valley Street Railway	10.10	188,500	175,800
Mountain Railway	2.00	2,400	.....
Monmouth County Electric Company	17.71	325,000	500,000
Mount Vernon Railway	9.00	10,000	40,000
Norton & Taunton Street Railway	21.20	297,000	296,000
Sapulpa & Interurban Railway	12.00	80,500	.....
Seattle, Renton & Southern Railway	25.00	1,250,000	825,000
Southeastern Ohio Railway, Light & Power Company	16.34	600,000	600,000
Southern Iowa Railway & Light Company	10.00	120,000	340,000
Syracuse & South Bay Electric Railroad	26.56	1,000,000	561,000
Syracuse, Watertown & St. Lawrence River Railroad	6.35	40,000	200,000
Youngstown & Southern Railway	38.13	1,588,200	948,000
Totals	431.35	$13,655,400	$22,542,300

*Authorized amount; outstanding amount not ascertainable

Short and Up-to-Date Articles on

EQUIPMENT AND ITS MAINTENANCE

Combination Snowplow for City and Interurban Lines of Spokane—Hardwood Key Blocks for Track and Pavement Work in New York—Reinstallation of Old Soldered Bonds by Sacramento Company—Economical Work by Pneumatic Tampers of Pittsburgh Railways—Mirror for Protecting Track Crossing in San Antonio, Etc.

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

A Combination Snowplow for City and Interurban Use

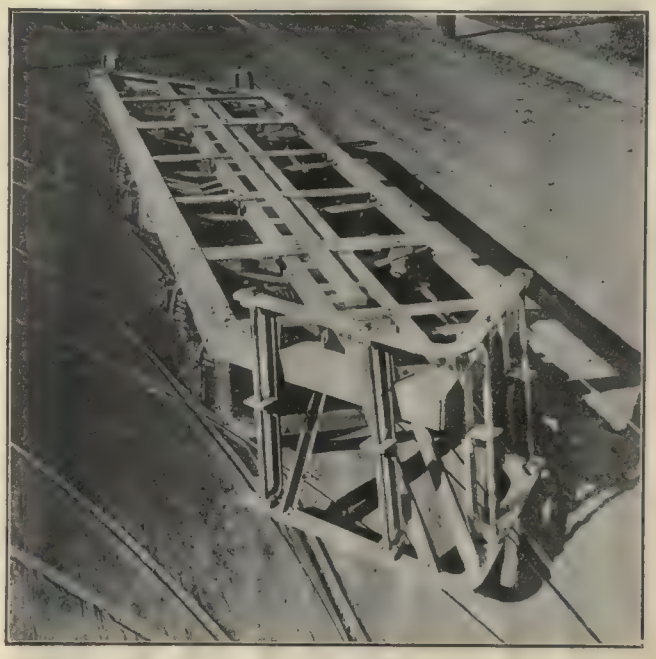
Washington Water Power Company Has Built a Plow Which Is Suitable for City and Interurban Snow Fighting

BY R. A. WILLSON
General Superintendent Washington Water Power Company, Spokane, Wash.

A snowplow to be used on the city and interurban lines of Spokane, Wash., has recently been built by the Washington Water Power Company. Inside a city, in clearing double tracks of snow it is desirable to use a shear plow which throws the snow to only one side of the car. On interurban lines, however, the snow often forms heavy drifts which the shear plow cannot clear off, and it is necessary to use a plow with a sharp nose which cuts through the snow and throws it to both sides. The plow described below combines both kinds of blade mounted on the same frame.

This frame is built of heavy structural steel, as may be seen from the illustration, the side sills, for example, being 8 in. x 8 in. channel bars. The width of the frame as shown is 7 ft. 10 in. and the length is 36 ft., and with the plows in position the total length is 43 ft. 3 in. The weight of the whole car and its equipment is 35 tons. Brill 27-F trucks having a 6-ft. wheelbase set with a distance of 15 ft. between centers are used, and mounted on these trucks are four 60-hp. General Electric motors which drive through gears having a ratio of 15 to 71.

The plows are of steel boiler plate mounted on heavy frames. The shear plow, as shown in the illustration, may be used in connection with the auxiliary wing which is shown swung in position at the center of the car. The shear is 12 ft. x 6 ft. and the wing is 10 ft.



HEAVY STEEL FRAME OF COMBINATION SNOWPLOW

x 3 ft., the maximum sweep of both shear and wing being 15 ft. Another illustration shows the sharp-nosed or wedge plow which is 9 ft. 9 in. across and 7 ft. high. It splits the heavy drifts and throws the snow to both sides. Both types of plow overhang the track 20 in. on each side. Their bottom or cutting edges are riveted to the main plow face and may be replaced if injured by striking an immovable object. By means of compressed-air cylinders, the plows are raised on slid-



VIEW OF NOSE PLOW USED FOR CLEARING HEAVY DRIFTS FROM THE TRACK



INTERIOR OF CAR, SHOWING COMPRESSOR, RESERVOIRS, OPERATING CYLINDER FOR SIDE WING, ETC.

ing rods to a maximum height of 10 in. above the rail. In addition to the plows, the car is equipped with spring steel track scrapers. These are held against the track under pressure, which may be made as high as 70 lb. for each scraper, but when they come in contact with an immovable object they spring over it without being damaged.

The car body is built of wood reinforced with steel and it has sixteen windows of ⅜-in. plate glass set in heavy frames. A tool box is built on the outside of the car for carrying picks, snow shovels and other tools. The car is equipped with a General Electric magnetite headlight which can be moved from one end to the other,



VIEW OF SHEAR PLOW AS USED WITH SIDE WING

and stationary Golden Glow headlights on each end. There is also a row of incandescent lamps circling the car underneath the eaves for general illumination of the surroundings.

As far as possible all of the operating mechanism is placed inside the car to avoid slush and snow. A view of the car's interior given here shows (on the left-hand side of the car) the air compressor, the large reservoirs and the cylinder for operating the side wing.

The convenience and comfort of the men running the car was carefully looked after. To this end the switches which control the different apparatus were plainly marked, and a radiator for warming the entire car and a small heater for cooking coffee, as well as comfortable chairs and a table, were provided. These luxuries serve to add some pleasure to what is usually a disagreeable task.

Soldered Bonds Reinstalled at Low Cost

Old Bonds Removed from Web of Rail and Soldered to the Rail Head

BY W. H. EVANS
Electrical Engineer Northern Electric Railway, Sacramento, Cal.

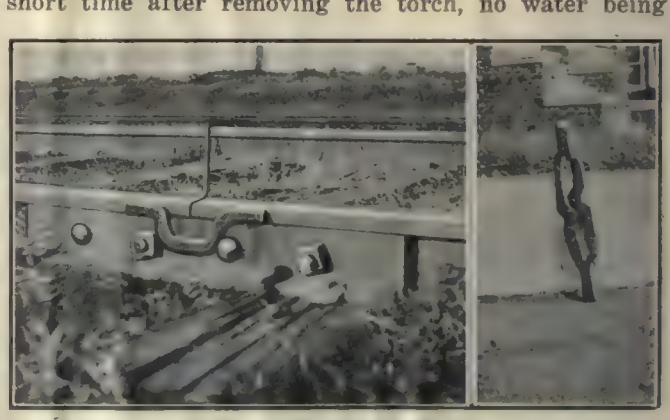
The experience of the Puget Sound Traction, Light & Power Company with soldered rail bonds, as outlined in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 28, 1916, page 938, is of interest to those companies which still use soldered bonds, and our own experience along these lines may prove of further interest, particularly as a large number of roads have had unprofitable experiences with the soldered type of bond.

The Northern Electric Railway has some 150 miles of track, mostly on private right-of-way, of 60-lb. A. S. C. E. T-rail section on which the bonding originally consisted of two 10-in., 200,000-circ. mil. ribbon type soldered bonds soldered to the web of the rail under the angle bars at each joint. Owing to the very restricted clearance under this joint the bonds soon became pinched and either failed by coming loose at one or both terminals or the ribbons broke at the center of the bonds. The cost of this type of bond installed was 55 cents each. The bond itself cost 27.5 cents, the other material such as solder, gasoline, etc., nine cents, and the labor, 18.5 cents. The average life of this bond was probably not in excess of six years, and a large number failed in less time.

It became imperative to rebond the line and after a consideration of various type of bonds, it was decided to install the same bond, but in a different manner. The choice was in a way influenced by the fact that we had on hand a large number of bonds of this type, and that financial considerations forbade any large outlay for new bonds.

The 10-in. bonds were placed in a frame and by means of a bulldozer were made to assume a U-shape with the ends turned out parallel to the top of the rail giving us a bond for application on the outside head of the rail. This newly-formed bond was then soldered to the head of the rail by a method which, I believe, was first developed on the Northwestern Pacific Railroad at Sausalito, Cal., and has been used by it for a number of years on soldered bonds with wonderful success.

This method as applied to our bonds consists in the formation of a substantial layer of solder between the bond terminal and the head of the rail in the following manner. The rail was first ground clean and bright, using a carborundum wheel electrically operated from the third-rail supply. Then some five or six small cuts were made vertically in the rail with hammer and chisel, the rail was then heated and tinned thoroughly, after which the bond, held in a pair of tongs, was placed against the rail and so inclined that the lower edge of the terminal touched the rail while the upper edge was about a quarter inch from the rail. Solder and heat were then applied by means of a gasoline bonding torch, care being taken not to get the rail too hot. The solder instead of running freely was puddled into the wedge-shaped space between the bond terminal and the rail. In other words, an effort was made to obtain a sort of wiped joint between the rail and the bond terminal, and while the solder was in this semi-plastic condition the terminal was pressed toward the rail leaving, however, about ⅛ in. between the terminal and the rail at the top. The bond was held in position by the tongs a very short time after removing the torch, no water being



VIEWS SHOWING NEW METHOD OF SOLDERING BONDS TO HEAD OF RAIL AND AN OLD BOND REMOVED FROM WEB OF RAIL

used to cool the joint; the other terminal was then applied in a similar manner.

This process tends to cause an even distribution of solder over the faces of the bond and the rail and leaves a cushion of solder between the two. The success of this method depends upon not getting a temperature so high as to cause the solder to run too freely, as if it flows too freely it acts like drops of water on a piece of glass, gathering in spots to cover some areas of contact

and leaving others with no solder. The latter in time oxidize and reduce the contact area of the terminal and also its holding power.

The concealed joints are tested by means of a Roller-Smith bond tester with a snap switch on the test handle of the test bar wired in series with auxiliary contacts at the ends of the test bar, and a small portable box of six dry cells so that the tester can use either the power current or the current from the battery. Unless traffic is very frequent we find that the auxiliary source of current is necessary if any number of joints are to be tested in an efficient manner.

In doing the rebonding it has been found profitable to open up all joints which test over 10 ft. of rail. About 50 per cent of the bonds thus reclaimed are in such shape that they can be used over again on the head of the rail and the remaining 50 per cent are so torn that they are scrapped, their value as scrap more than compensating for the cost of opening up the joints.

While the new method of bonding consists of but one bond per joint whereas there were two originally, a completely single bonded line is obtained with no expenditure for new bonds since, as noted above, about half of the bonds removed are in suitable condition to be reinstalled. At the present price of copper this means a large saving, and at the same time we have obtained a bond which promises a life at least equal to the former type, and one much more easily maintained when it does fail.

About 30,000 soldered bonds of this type have been installed, the costs of which are shown below:

Material per Bond	Unit	Amount	Unit Cost Cents	Total Cost Cents
200,000-circ. mil bond		1.0	27.5	27.50
Gasoline	gal.	0.04	11.0	0.44
Solder	lb	0.13	19.5	2.53
Soldering salts	cans	0.0035	180.0	0.63
Carborundum wheels	each	0.001	202.0	0.20
				31.30
Store-expense, 4 per cent				1.25
				32.55

Labor per Bond—	Cents
Testing	0.89
Supervision	0.50
Soldermen	4.09
Torchmen	3.72
Grinding	1.87
Miscellaneous	0.93
	12.00
Use of tools, 2 per cent	0.24
Total Labor	12.24
Total Material	32.55
	44.79

The rates of pay per day for this work were: foreman $3.50, soldermen $2.75, torchmen $2.50, grinders $2.50, all men working a nine-hour day. The gang usually consisted of a foreman, four soldermen, four torchmen and two grinders, with an extra man at $2.50 for part of the time to aid in painting the bonds after installation. The foreman tested all joints as well as running his gang. The men lived in an outfit car which was spotted on adjacent spurs and moved along the line as the work progressed.

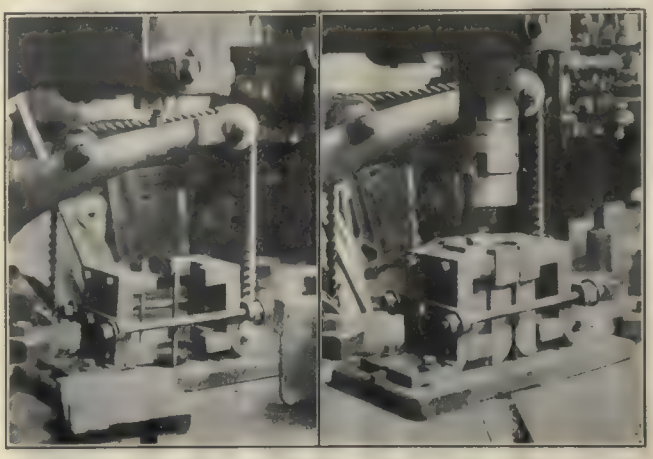
It was found that the bonding men could do much better work if the connection between the tank and burner was made with about 30 in. of rubber hose instead of the iron pipe usually used. The heavy gasoline tank can then be placed on the ground at a convenient position, and the burner applied in the position most suitable for directing the flame on the rail and bond. Some experimenting has been done with the oxy-acetylene process in connection with these bonds, but the shape of the head of the bond terminal has so far prevented us from getting a good job with this process.

On the tracks in city streets we have been using for several years a flexible jumper bond, installed around the joint plates and soldered to the flange of the rail, in a manner similar to that used by the Puget Sound Traction, Light & Power Company. A large number of these came from old scrap third rail jumper cables which would have been sold for scrap but by this method are used for city bonding work, thus eliminating the necessity of purchasing new material.

Home-Made Jig for Boring Brasses

BY L. J. GOUTHRO
Foreman of Machine Shop Boston & Worcester Street Railway

At the Framingham (Mass.) shops of the Boston & Worcester Street Railway the jig shown in the accompanying illustrations is used to expedite the boring of brasses. Fig. 1 shows the jig open, ready to receive the brasses, these being bored in pairs when set up as shown in Fig. 2. The jig consists essentially of a pair of clamps mounted on an adjustable base which is

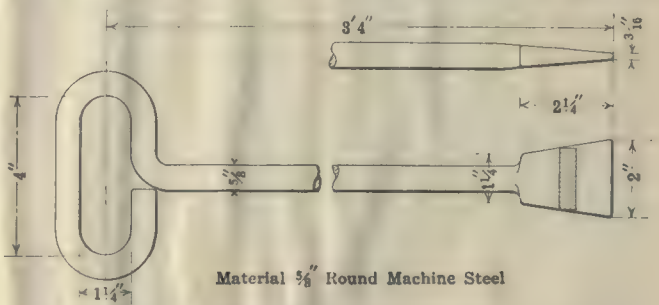


JIG FOR BORING BRASSES—FIG. 1—JIG OPEN; FIG. 2—JIG WITH BRASSES IN PLACE

attached to the bedplate of the boring machine. These clamps are brought up against the work by two ⅝-in. bolts, and the brasses are centered by two ¼-in. x ⅜-in. vertical rods, which, when turned, give an adjustment of 1/16 in. in diameter at the brass. About 3 in. of horizontal adjustment can be had at the clamps. Two brasses of any size that the road uses can be bored out in ten minutes, whereas such an operation on a single brass would easily take twice as long on a lathe or milling machine.

Switch Iron

The New York State Railways, Rochester Lines, is now making switch irons according to the accompany-



DETAILS OF NEW YORK STATE RAILWAYS SWITCH IRON

ing drawing. The print from which the cut was made was furnished by G. M. Cameron, master mechanic, and is dated Dec. 27, 1916.



WEST BROADWAY AND CANAL STREET—CONTRAST FILLER AND KEY BLOCK CONSTRUCTION WITH GRANITE IN FOREGROUND



BOWERY AND WILLIAMSBURGH BRIDGE—ONE OF NEW YORK'S HEAVIEST TRUCKING CENTERS—NOTE ORDINARY GRANITE ALONGSIDE

Rail Fillers and Key Blocks Prolong Special Work Life in New York City

Special Paving Used by the New York Railways at Street Crossings Subject to Heavy Traffic

About three years ago the New York Railways tried the experiment of lengthening the life of granite block paving and special work at Twenty-third Street and Fourth Avenue and Twenty-third Street and Sixth Avenue by installing hardwood key blocks between the granite and rail fillers along the rails. The blocks and fillers were supplied by Edward Alcott, Manassas, Va., who recommended that the key blocks be driven to such a depth that they would project, say, ¼ in. above the granite blocks on each side.

The initial jobs proved so satisfactory that the New York Railways decided to adopt this construction for practically every piece of special work on its system. At this writing more than sixty intersections have been so paved, and at some locations the plan has also been applied to the straight runs.

The actual results obtained with this method of prolonging rail life were noted in a recent inspection trip which covered some of the heaviest car and trucking streets in the world. In every instance the Alcott paving and the special work paved therewith were found to be in decidedly better condition than adjacent construction.

The inspection was made during and after a heavy rainstorm, thereby making apparent the non-slip advantages of the key block paving. As previously stated, the key blocks, as installed, project ¼ in. above the granite. The tendency of traffic is to drive these blocks down, thereby keeping the paving wedged tight, but still leaving it rough enough to give an excellent footing for horses and a better grip for automobile tires. Naturally, this construction is also watertight and therefore is not damaged either by rain or flushing by the street cleaning department.

As the key blocks assure a tight paving structure, movement of the special work is materially reduced at a great gain in the direction of noiselessness and in the reduction of track maintenance cost. To use one track foreman's expression, "They never loosen like granite does." Another consequence of this, noted after the storm in question, was the absence of water pockets and puddles. The latter condition elicited praise from the traffic policemen who are stationed at intersections.

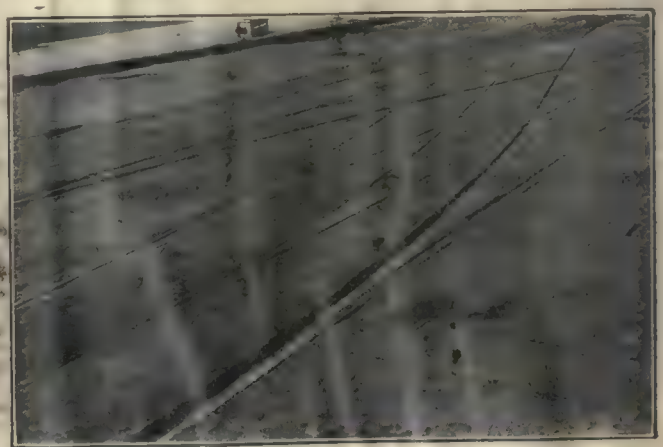
As the New York Railways installations are so numerous, it will serve to mention the following few typical cases:

Thirty-fourth Street and Eleventh Avenue. At this point the Thirty-fourth Street cars cross the New York Central freight tracks on Eleventh Avenue. On this avenue there is also extremely heavy trucking from the warehouses and river terminals. The paving has been in service one and one-half years. Other installations along Thirty-fourth Street are at Tenth, Ninth and Eighth Avenues and Cortlandt and West Streets, the last-named having been in use more than two years and nine months.

Forty-second Street, the most important crosstown thoroughfare for car and automobile travel. Alcott paving is found at Lexington, Sixth and Ninth Avenues.



WEST BROADWAY AND CANAL STREET—GENERAL VIEW OF INTERSECTION SHOWN IN DETAIL ABOVE, INDICATING CHARACTER OF TRAFFIC



CORTLANDT AND WEST STREETS—COMBINATION OF KEY BLOCKS AND RECLAIMED GRANITE—NO UPKEEP COST IN TWO YEARS AND NINE MONTHS

The intersection at Sixth Avenue is within two blocks of the New York Hippodrome.

West Broadway from Bleecker to Broome Streets. In this installation the blocks are used from rail to rail without any pinching of the conduit slot, showing that there is no swelling of these blocks.

Other important installations are at Twenty-third Street and Fourth Avenue, now in service three years; Canal Street and Broadway, Cortlandt and West Streets, Delancey Street approach to the East River Bridge, etc.

Long Bracket Arms for Narrow Roadway

In the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 30, 1916, page 684, there appeared an account of an installation of unusually long bracket arms on the Brooklyn Rapid Transit System. In this case the purpose was to avoid interference between a cableway



LONG BRACKET ARMS INSTALLED BY VIRGINIA RAILWAY & POWER COMPANY AT NORFOLK, VA.

constructed by a contractor for digging a sewer in an important street and the span construction in use for supporting the trolley wire.

The Virginia Railway & Power Company has made use of a similar scheme at one location on its right-of-way where it is so narrow that it is impracticable to set poles on both sides. A wagon road runs along one side of the tracks and the brackets span this road and the two car tracks.

The pole bracket arms, which were furnished by the Ohio Brass Company, are 23 ft. long and are made of 2-in. C-tubing. They are braced by 1½-in. C-tubing braces and in addition are supported by two rods attached to each arm. In order to protect the wooden poles from damage by wagon hubs, renewable V-shaped guards are placed at the bottom of each pole.

Pneumatic Tampers Cut Labor Cost in Half in Pittsburgh

The Tamping Outfits Also Reduce the First Cost of Welding Equipment

The Pittsburgh Railways was one of the first to use pneumatic tampers. The present equipment consists of two compressors, each of which furnishes power for a battery of six tampers. These machines have three lines, respectively 50 ft., 100 ft. and 150 ft. long and each line takes care of two tampers.

The company is also planning to purchase five portable sets, made to handle four tampers each, in order to secure the convenience of working with compressor equipment that can be kept off the tracks where traffic is being maintained upon the tracks undergoing repairs.

As in other installations, the pneumatic tampers show a decided saving in cost, the saving per foot of track being about 15 cents or one-half of the former cost. The proportionate saving in men, however, is greater, and this is an advantage, particularly as the much smaller force that is required is of a higher grade. There is only 30 per cent of the force used that would be required for hand tamping.

The ballast used in Pittsburgh is classified as "coarse," in which sizes up to 2½ in. are used, and as fine, in which 1 in. is the largest size. The machines tamp both classes of ballast much better than was customary with hand labor. Though the tamping is done as a rule with the 1-in. ballast, the rough ballast is spread, compacted and rolled to a depth of about 6 in. before the track is laid.

The company has also taken advantage of the Ingersoll-Rand tamping equipment to reduce the first cost of Thermit welding outfits. The ordinary preheater used in connection with Thermit joints includes a blower outfit which costs about $600. The Pittsburgh Railways only find it necessary to use of this outfit the tanks and burners costing about $35 to do the preheating in connection with reduced air pressure supplied from the compressor outfits.

A second by-product of the tamping equipment is the forthcoming use of small air drills, which are lighter than electric drills, in making joints immediately following the tamping. Also having compressed air on the job, it may be found to be useful to run air drills to break up and remove concrete.



PNEUMATIC TAMPERS AT WORK IN PITTSBURGH—SERVICE CAR WITH TAMPING OUTFIT, AND TAMPING GANG; PAIR OF TAMPERS IN ACTION; MIXER TANK AND BUNSEN BURNER REPLACING WELDING PREHEATER

Mirror Used in Safeguarding Crossing

The accompanying illustration shows how W. W. Holden, superintendent of transportation San Antonio (Tex.) Traction Company has used a mirror to do the work of a signal in protecting a crossing on his road. The route of car A is straight head while car B takes the route indicated by the dash line and arrow points. The track layout is such that before the mirror was

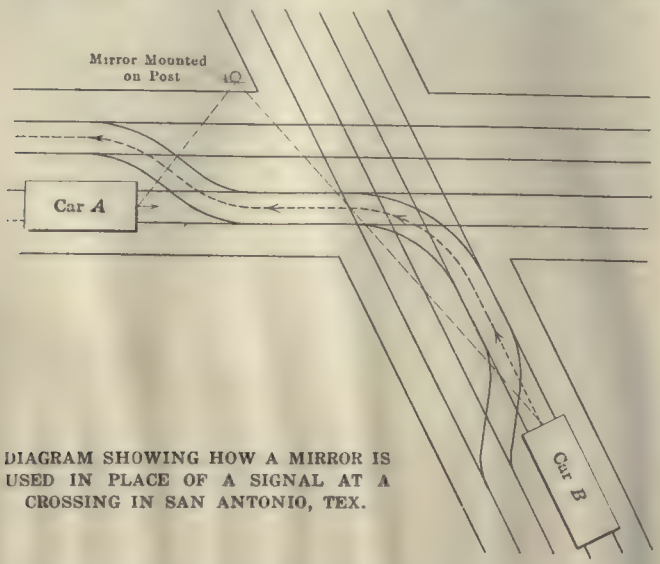


DIAGRAM SHOWING HOW A MIRROR IS USED IN PLACE OF A SIGNAL AT A CROSSING IN SAN ANTONIO, TEX.

used the motormen on the two cars could not see each other. The placing of a mirror at the point shown in the diagram brings the two cars within view of each other before they reach the crossing, and thus the danger of a collision is greatly reduced.

The mirror is 30 in. x 45 in. in size and is protected by a wire screen. It is mounted on a post using two turnbuckles to provide for easy adjustment.

Electric Shoveling

Shoveling with the motive power of a street car reduced the cost from 12 cents to 5 cents per yard on about 2200 ft. of double track in Dallas, Tex. R. G. Taber of the Stone & Webster organization, general managers of the Consolidated Electric Street Railway, was in charge of electrically welding a section of new track. As the car used for transporting the welding outfit remained idle most of the time Mr. Taber conceived the plan of putting it to work. He fastened a



STREET CAR USED TO PULL SCRAPER IN DALLAS, TEXAS

rope to a scraper as shown in the accompanying illustrations, passed it through a pulley which was hooked over the rail and tied the other end to the car. The scraper was taken out beyond the dirt which was piled on both sides during the laying of the track. Then the car was started and the scraper was pulled in toward the track, gathering a load as it came. The cost mentioned above covered everything (including the motorman's wages) except the power used by the car.

Frogless Switch Makes Continuous Rail for High-Speed Track

A mechanism for eliminating the break in the rail and the two pieces of guard rail necessary, and to form a continuous rail at a switch, has been developed by the Walls Frogless Switch & Manufacturing Company, a Colorado corporation of Kansas City, Mo. This consists of a section of rail which is made to take the place of the usual frog, and which is turned with the switch point to form a section of either the main-line track or the switch track. This section of swing rail is 7 ft. long and rests on a plate of steel carried on the track ties. As the section of rail is thrown with the switch point to either position, it is locked on both sides of either end to prevent it moving while a train or car



FROGLESS SWITCH INSTALLED ON SANTA FÉ RAILWAY TRACK

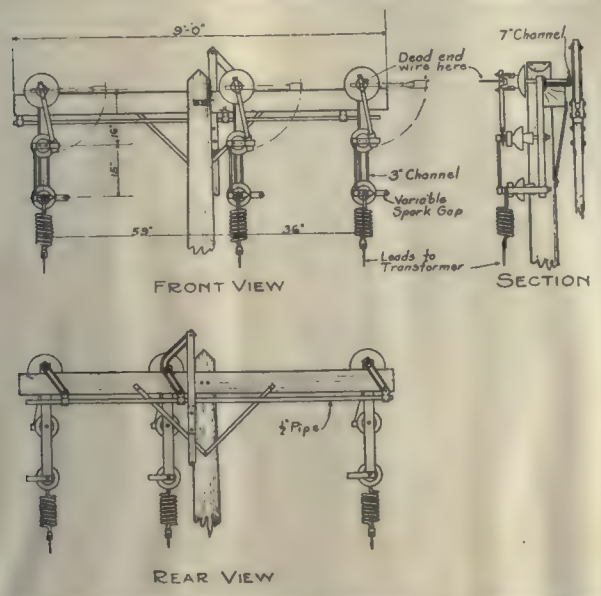
is passing over it. One of these locks at each end is affected by inserts in the bearing plate, and the other by means of a rod running parallel with the rail and contained in a housing, which inserts a bolt at either end, the combination affecting five locks in 7 ft. of rail. The steel plate under the frog is 15 ft. long, taking care of the bearing area for the 7-ft. rail section and supplying 3 ft. anchorage at either end leading onto the frog. Expansion and contraction are taken care of by mounting a short section of rail at each side of the swing section, and then as rail and bearing plate expand or contract, no difficulty is had with the rails binding.

Thermo-Couple and Potentiometer for "Hot Spot" Temperature Measurement

The importance of knowing the temperature of the hottest part in electrical machines is now well recognized. An accurate and reliable method of measuring temperature in parts inaccessible to thermometers is by means of a thermo-electric couple. The practice of building such couples into the windings of large machines at points where the highest temperatures are reached, though of comparatively recent origin, is fast becoming standard. For measuring the temperature at a point where a thermo-electric couple has been installed a potentiometer is utilized. This instrument balances the electromotive force of the couple under test against that of another couple at a known temperature. This avoids all errors due to variation in resistance of leads, etc. As all indications are on the zero-reading principle, very accurate readings can be obtained. A handy set for this purpose made by the Westinghouse Electric & Manufacturing Company combines in one case a standard couple and a potentiometer.

Pole-Top Switch

Low cost, simplicity and ruggedness are the claims of the makers. the K. P. F. Electric Company, San Francisco, for the switch shown herewith. This switch is fabricated from structural iron, and is then hot-dip galvanized. No clamps are used on the insulators, cemented caps being employed. The units are shipped from the factory in assembled form. To install them it



POLE-TOP SWITCH CONNECTED TO FUSES AND CHOKE COILS

is only necessary to bolt the three units to the crossarm and attach the line wires and control rods. The channel baseplate and the channel arm supporting the insulators are riveted together, and no amount of warping of the crossarm, it is claimed, can throw the switch arms out of alignment. While the three legs of the circuit are opened and closed simultaneously by means of the rear control rod, each pole of the switch is separate from the others and is self-contained.

Creosoted Block Pavement Standardized

The chief defects of creosoted block pavement have been the occasional tendency to expand and buckle and the bleeding or exuding of oil caused by the blocks being improperly treated. While the character of the oil has frequently been held responsible for these defects, the method of treatment and the character of the timber of which the blocks are manufactured are of greater importance. The pressing need for a uniform standard for this pavement has been realized, and a specification has been adopted by the American Society of Municipal Improvements, Chicago, Ill. This specification has already been indorsed by five other leading engineering and municipal societies interested in this subject.

The vital points covered by the specifications are the timber, preservative compounds, treatment, and the method of laying the pavement. The quality of the timber is based on its density, and specific directions are given for measuring the number of rings in a definite distance and the determination of the percentage of summer wood in that region. The preservative specification allows the use of two types of oil, the first a coal tar solution consisting of a creosote oil to which a limited amount of refined coal tar is added, and the second a coal tar distillate oil the qualities of which are clearly defined. Careful descriptions are given of the methods of sampling and testing the preservative. The oils allowed include practically all the high-grade oils previously used in preservative specifications.

The treatment specifications state that the timber should preferably be only partly seasoned, and that green and seasoned timbers shall not be treated in the same charge. Approximately nine hours is the length of treatment required to give a uniform distribution of the oil. The need of an adequate preliminary steam treatment with proper time and temperature limits is also emphasized.

In laying the pavement sand gives too yielding a base when used as a cushion, and as a filler it allows water to get under the paving, thus causing swelling and consequent buckling. This can be prevented by the use of a bituminous filler. A new method of construction is recommended in which a coating of coal tar pitch or other suitable water-proofing paint is applied in a thin coat over a smooth base of concrete. The wood blocks are placed upon this coating within at least thirty minutes of its application. The specification as a whole has received the best thought of many authorities, and if consistently followed there is little doubt that most of the troubles charged against wood block pavement will be eliminated.

Circuit Breakers for High Voltage

The circuit-breaker illustrated herewith is one of a line recently developed by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. These breakers range in capacities from 300 to 1200 amp. at 23,000 volts, and from 1600 to 2000 amp. at 16,600 volts. All-steel construction is used, rendering them compact for their rupturing capacity. They are made up of single poles mechanically connected so as to permit spacing according to local conditions. For cell mounting, the steel base of each pole unit is held in channel irons built into the cell walls and the single pole solenoid is mounted with its mechanism on a plate and channel frame fastened on top of the cell. To enable them to break the arc quickly the breakers are provided with accelerating springs. Adjustable air-cylinder dash-pots take up the shock of the moving parts at the full open position. The moving contacts are of the laminated-brush type and they are protected by butt-type arcing contacts of considerable size.



HIGH-VOLTAGE, HIGH-CAPACITY CIRCUIT-BREAKER MOUNTED IN CELL

Recently tests were made on one of these breakers by short-circuiting a 25,000-kva., 23,000-volt turbo-generator, five tests being made without external reactance in the circuit, five tests with 5 per cent 500-amp. reactance coils and six tests by short-circuiting the line at a substation 8 miles distant, the circuit including about 3 miles of cable. After the tests the breaker was opened for inspection, and there was no evidence on the arcing tips of excessive burning.

London Letter

Topics Discussed Mostly Those Growing Out of the War—Claygate Electrification Completed

(From Our Regular Correspondent.)

The Ashton-under-Lyne Corporation, in conjunction with the Waterloo and the Bardsley Parish Councils, recently took the first definite step towards acquiring the tramway system of the Oldham, Ashton & Hyde Electric Tramways, operated under private management for about twenty-five years. The Ashton Council decided to promote in the next session of Parliament a bill to make provision in respect to the purchase of the undertaking. Agreements were also confirmed with the Parish Councils of Waterloo and Bardsley for the transfer of their powers to the Corporation. The bill seeks to authorize the Corporation to construct additional tramways in the borough and to provide and run omnibuses. In the event of the bill being passed, it is hoped to establish through inter-running between Ashton and Oldham.

A bill will be promoted next session by the Nottinghamshire & Derbyshire Tramways to empower it to purchase the tramway of the Corporation of Ilkeston. The bill will confirm and carry into effect the indenture dated Nov. 5, 1916, between the Corporation and the company for the transfer of the undertaking.

The motormen of the Newcastle Corporation tramcars have made a request to the management for a cessation of work at 10.30 p. m. during the winter months. This is due to the excessive strain upon the men in driving the cars for so many hours in darkness, both morning and night. The committee is anxious to give due consideration to the men's request, and also to cause as little inconvenience as possible to the public and to the places of entertainment. The members of the tramway committee have discussed with theater managers the desirability of altering the hours of performances, with a view to meeting the changed conditions under which the tramway system is at present being worked.

The financial position of the Hull Corporation Tramway has necessitated several important changes. These will be made with the sanction of the City Council. Since the war all sailors and soldiers have had the free use of the cars, and the privilege has naturally been enjoyed to the fullest possible extent. Some time ago commissioned officers were asked to pay as ordinary passengers, and now it is proposed to charge the rank and file half-penny fares. Wounded men will still be allowed to use the cars free. In order to effect an economy in wear and tear, the tram service will be curtailed. The chairman at a recent committee meeting stated that it was estimated that for the year 1916-17 there would be a deficiency of £2,447. He also stated that there would have to be a revision of stages, and the abolition of penny through rides from extreme points of the service. Owing to the shortage of drivers, the manager had been empowered to introduce women drivers where advisable.

There is every prospect that passengers of the Liverpool Corporation Tramways will soon hear the stations announced automatically by a gramophone arrangement connected with an electro-magnetic route indicator. This ingenious contrivance is the invention of Mr. Mallins, the general manager of the tramway.

An application put forward by employees in the traffic section of the London County Council tramways for an increase of 15 per cent on all current rates of wages formed the subject of arbitration proceedings at the Chief Industrial Commissioner's Department, Westminster, recently. The claim was based on the ground of the higher cost of living, and more than 5000 workers were affected, including men and women conductors, and pointsmen. A concession of 2*s.* a week, in addition to the existing war bonus of 3*s.*, and 6*d.* for each employee's child under fourteen years of age, was offered by the London County Council, but this offer was declined. At the close of the proceedings, which were conducted in private, it was announced that the decision of the arbitrators would be communicated to the parties interested after full consideration of the evidence laid before the tribunal.

Suggestions were made recently by local authorities that there is danger, during Zeppelin raids, from tramways and railways. The Field-Marshal Commanding-in-Chief of the Home Forces now points out that it is confidently believed that it is only necessary to assure the public that the continuance of railway and tramway traffic does not serve as a guide to hostile aircraft, and is of vital importance for the successful prosecution of the war for them to accept the decision and co-operate in carrying it out with loyalty and patriotism.

Stoppages are still taking place on the Birmingham Corporation Tramways, owing to lack of power. An endeavor is being made to give the necessary motive power for tramway purposes so as to enable a limited number of cars to be run on all routes throughout the day at times when the pressure of the factories is greatest. The matter has been referred to the Ministry of Munitions, whose local representatives are giving careful consideration to the question with the object of effecting an improvement in the supply of electricity to the tramways.

The electrification of the Claygate portion of the London & South-Western Railway's suburban lines has been completed, and a half-hourly service of electric trains between Claygate and Waterloo, covering the journey in twenty-nine minutes, has begun. There will be extra steam trains morning and evening.

One of the most interesting appointments to readers of this paper in the cabinet of ministers under the new Lloyd George Government, is that of Sir Albert Stanley to the post of president of the Board of Trade. Sir Albert has now a world-wide reputation as a most successful organizer, and for the past few years has been the managing director of the Underground Electric Railways, London. Brought to London by the absolute necessity of having a strong man to co-ordinate the services of the various underground railways and tube railways, Sir Albert has made a complete success of the whole system. Two years ago he was granted a knighthood, and now this further honor has been conferred upon him in recognition of his valuable services in connection with the transport problems of London. Sir Albert has already helped the Government in many ways connected with the transport problem at the front, and is now put in a position where his great abilities will be used to assist the whole country.

The business of the A. E. G. Electric Company, one of the three subsidiaries in England of the Allgemeine Elektricitäts Gesellschaft of Berlin, has been sold by the controller appointed by the Board of Trade to Dick, Kerr & Company, Ltd., London and Preston. The A. E. G. Electric Company was the most important of the three subsidiaries, and had offices and works in London, Newcastle, Cardiff and Birmingham. It had undertaken large contracts, and one of the reasons advanced for the continuance of its operations after the outbreak of war is understood to have been the importance of the work it had undertaken. The contracts varied in value from £1,000 to about £40,000, and the liquid assets held in this country amounted to more than £100,000. Before the war the company employed many German mechanics, and the whole of the capital was held by the parent company in Berlin. During the war the German staff is stated to have been replaced by a British staff, and the latter is now taken over by Dick, Kerr & Company, together with a number of uncompleted contracts.

It will be remembered that a short time ago Dick, Kerr & Company also obtained the control of Willans & Robinson, Rugby, who manufacture steam turbines, pumping and condensing apparatus, etc. They have also obtained control recently of the United Electric Car Company, Preston, with which they had a working agreement for many years. All of these businesses will now be entirely in the hands of Dick, Kerr & Company, who are gradually putting themselves into a very strong position to conduct the very largest kind of enterprises in any part of the world as soon as the opportunity arises. They will be in a position to control the manufacture of almost every piece of apparatus that can be installed in connection with the most elaborate electric power, electric tramway or electric railway enterprises, and by these consolidations will become one of the most important manufacturing and contracting companies in Europe.

A. C. S.

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

Extension of Line Ordered

Berkshire Street Railway Ordered to Complete Intra-State Connecting Link

The Public Service Commission of Massachusetts issued an order Dec. 30, 1916, requiring the Berkshire Street Railway to complete its Lee-Huntington line for service on or before July 1, 1917. The order answers a petition of the selectmen of five towns traversed by the line which was constructed under the provisions of Chap. 601, Acts of 1910, which authorized the purchase of the Berkshire company by the New York, New Haven & Hartford Railroad and required the building of this line among others as an incidental feature of the purchase. In 1912 the then Board of Railroad Commissioners extended the time of completion of this line from Jan. 1, 1913, to Jan. 1, 1914. No further extension of time has been granted by the commission or requested by the company.

The entire line, which is 23.86 miles long, was nearly completed three years ago. In December, 1915, the commission granted a certificate of operation for a section of the line 12.54 miles long, from East Lee to Otis. Soon afterward informal complaint was made to the commission because of the failure of the company to operate the entire line. In August, 1916, the board authorized the company to operate an additional 3800-ft. section. The company stated at a hearing before the board that it desires to postpone as long as possible the completion and operation of the section of the line from Algeree Four Corners, Otis, to Blandford, and that it had no intention or desire to complete and operate the remainder of the line from Blandford to Huntington, unless ordered to do so by proper public authority.

The attitude of the company was influenced by its financial condition and by the physical condition of the line. Construction has been difficult and costly in the hilly region traversed, about $3,000,000 having been expended. The company also claimed that the operation of the entire line would involve a financial loss which it ought not to be called upon to assume in its present financial condition.

The Berkshire company failed to pay its operating expenses and fixed charges in 1916 by more than $87,000. After every reasonable allowance had been made for any possible inflation in the company's capitalization or floating debt, it did not appear that the company's financial status was such as to justify the commission, under ordinary conditions, in requiring the company to assume an additional financial burden through the operation of an unprofitable line. This case differed, however, in important respects from a proceeding brought under the general law to compel a street railway to build and operate an extension of its existing lines. This line had already been substantially completed at an estimated cost of about $3,000,000. The obligation to build was definitely imposed by the Act of 1910, as one of the considerations for permitting the New Haven company, contrary to the general law and policy of the State, to acquire and hold the capital stock of a street railway. This legislation was actively sought by the New Haven company, not with any expectation that the operation of the Berkshire company would in itself prove profitable, but that the existing and projected lines of the Berkshire company would serve as feeders to the New Haven road, and would develop a large amount of long-haul business for the latter, which would be sufficiently profitable to offset any loss from the Berkshire property. The commission holds that the agreement of the two companies, evidenced by their acceptance of the act, raises what is virtually a contractual obligation to complete and operate the line.

Six of Ninety Contracts Unawarded

These Are All of the New York Contracts Unlet. Many New Lines to Open Soon

Only six general construction contracts out of ninety for the dual system of rapid transit remain to be awarded by the Public Service Commission for the First District of New York. Several important portions of the new lines will be placed in operation during the year 1917, adding materially to the present traffic facilities of New York. Several track installation contracts and station finish contracts for a number of stations remain to be awarded. These for the most part will be delivered during 1917. At the end of the year the Public Service Commission had completed or had awarded contracts for construction work on the new lines to be owned by the city of New York aggregating $196,278,900. In addition, expenditures had already been made or authorized to the amount of nearly $15,000,000 for real estate in connection with rapid transit work. Portions of this real estate, however, will be resold.

Exclusive of the above expenditures, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, which will operate the new rapid transit lines, entered into contracts and agreements involving large amounts in connection with rapid transit work. While exact figures are not at hand as to the amounts involved, it is roughly estimated that the two companies had expended and were under obligation to the amount of $35,000,000 all told for construction work upon company owned lines, making the total of construction contracts let by the city and the companies for all work about $231,000,000. In addition, the two operating companies will contract for $20,000,000 of equipment which they must supply.

Among the city owned lines which it is hoped may be placed in operation during the coming year are the Astoria and Corona extensions, the White Plains Road extension, the Jerome Avenue extension and a portion of the Southern Boulevard extension of the Lexington Avenue line, together with the main stem of the Lexington Avenue line, the Seventh Avenue Subway in Manhattan, and possibly a portion of the Flatbush Avenue and Eastern Parkway Subway in Brooklyn, for operation by the Interborough. The major portion of the Interborough lines will be in operation by the end of this year. Of the city-owned lines for operation by the New York Municipal Railway Corporation of Brooklyn, it is believed that a part and possibly all of the Broadway Subway in Manhattan will be in operation. Such operation will be in part a shuttle service south of Canal Street and a through service from Brooklyn by way of Manhattan Bridge and Canal Street north of Canal Street. Reports indicate that during the coming year the Second Avenue elevated line extension across the Queensboro Bridge and possibly the extension of the Ninth Avenue elevated line to a connection with the Jerome Avenue line will be placed in operation. New elevated facilities for operation by the Brooklyn company expected during the year are the third tracks on the Broadway line from Myrtle Avenue to Aberdeen Street, the Jamaica Avenue extension from Cypress Hills to Jamaica, and the third tracks on the Myrtle Avenue line between Broadway and Wyckoff Avenue.

Since the first of the year the third track on the Broadway line, Brooklyn, between Myrtle Avenue, Williamsburg, and Aberdeen Street, East New York, has been placed in operation for the use of express trains from Canarsie. Within the last few days there has also been opened for service the extension of the elevated lines on Jamaica Avenue from Crescent Street, Cypress Hills, to Grant Avenue, Woodhaven. This last extension is a section of the new elevated route from Cypress Hills over Jamaica Avenue to Jamaica.

Beaver Valley Traction Entertains

Christmas Reception Planned by Superintendent Boyce—Newspaper Participates by Sending Gifts

The sixth annual Christmas entertainment for the employees and families of the Beaver Valley Traction Company, New Brighton, Pa., was held on Dec. 20 at the pavilion at Junction Park, owned by the company. It was the biggest affair of the kind the company has held. The entertainment of the children, of whom there were more than 300, was a feature. W. H. Boyce, superintendent of the company, planned the affair and in carrying out the program he was ably assisted by Mrs. Boyce, J. E. McKirdey, advertising manager of the Pittsburgh Railways Company; Mr. Hay, president of the Pittsburgh section of the National Electric Light Association, and others. An enormous Christmas tree strung with red, white and blue electric light bulbs, red and green papier maché rope, gilt and other brilliant ornaments, stood at the lower end of the dance floor, while hundreds of lantern-effect shades were draped over the lights of the room. The entire pavilion was strung with garlands and on every hand were cards bearing the inscription "We wish you all A Merry Christmas and A Happy New Year," signed by the Beaver Valley Traction Company.

The children were entertained royally for an hour and in turn sang Christmas carols for Mr. Boyce. Each received candy, a toy and a monkey-on-a-stick. Shortly after 5 o'clock the employees of the company, their wives, families and sweethearts arrived with their friends. As they came in each employee walked up to the tree and gave his name. Miss Blanche Moore, acting as clerk to Santa Claus, had a list of all the employees and the number of the package each was to get. In addition there was candy in boxes and boxed peanuts, the latter complimentary from *The Beaver Daily Times*. For each of the men of the company there was a handsome lapel watch chain. For the women guests there were necklaces of beads and other jewelry and ornaments. C. C. Shetterley, lessee and manager of Junction Park during the past season, also presented cigars to each employee of the company. Lunch was prepared for 700 persons. Shortly after 1 a. m., the employees who had been out all night with cars began to arrive. These belated arrivals received their gifts and were entertained with music. The company hung in its cars, over its own name, a placard, 19 in. by 13 in., in colors, on which was printed this Christmas sentiment "We wish you All a Very Merry Christmas and a Happy and Prosperous New Year."

U. S. Circuit Court Dismisses Strike Injunction

The United States Circuit Court of Appeals at Chicago, Ill., on Jan. 2 reversed the ruling of the United States District Court at Indianapolis, Ind., in the case of the Indianapolis Traction & Terminal Company, and dismissed the injunction against W. D. Mahon and other officials of the Amalgamated Association and the employees of the Indianapolis Traction & Terminal Company restraining them from calling a strike against the company. The Court of Appeals ruled that the District Court had no jurisdiction in the matter because the real parties at interest were both residents of the State of Indiana, and therefore the action should have been in the state court and not in the federal court.

The suit was brought in 1914 by the Guaranty Trust & Safe Deposit Company, Philadelphia, Pa., trustee under the mortgage of the Indianapolis Traction & Terminal Company, and was a suit on contract—that of the arbitration award which ended the strike of November, 1913. In the hearing before Judge Anderson of the United States District Court at Indianapolis, the plaintiff proved that a strike in violation of the arbitration award was imminent, and the defendants, who included members of the street railway men's local union and officials of the Amalgamated Association, offered no testimony.

When the matter of the threatened strike was first brought before Judge Anderson in September, 1914, he declined to issue a temporary restraining order ex parte. He called the attorney representing the union and asked that it guarantee that no strike would be called that night, but when the attorney refused to assure the court that the contemplated strike would be held in abeyance until a hearing, Judge Anderson then issued the restraining order. Two months later, proof of the threatened strike having been given at the hearing and no evidence being offered by the defendants, the temporary injunction was issued. An appeal was then taken by the unions to the Circuit Court of Appeals, but no decision was handed down by the Court of Appeals until Jan. 2, 1917. The court held that the bringing of the action in the name of the Guaranty Trust & Safe Deposit Company, Philadelphia, and omitting the name of the Indianapolis Traction & Terminal Company as a party plaintiff was not the proper procedure.

Town to Help Complete Railway

Massachusetts Municipality Shares Construction Cost for Completing County Street Railway

The Public Service Commission of Massachusetts has concluded an investigation of plans for completing the Plymouth & Sandwich Street Railway, under which the town of Plymouth shares in the construction cost of the road. By Chap. 95, Acts of 1911, the town was authorized to purchase securities of the road to the amount of $50,000 to facilitate building the railway, which is to serve sparsely settled territory in the Cape Cod district. The town was not allowed to subscribe, however, until the commission had found that reasonably sufficient financial arrangements had been made to permit the completion of the line. The company now petitions the commission to enter such order as may be necessary to authorize the subscription by the town. A portion of the line 6.15 miles long, from Plymouth to Fresh Pond, has been completed, a further portion, 1.85 miles long, between Sagamore Beach and the Cape Cod Canal, has been built but not as yet operated; and there remains to be completed 9.9 miles, between Fresh Pond and Sagamore Beach and between the Cape Cod Canal and the Bourne-Sandwich line.

On Dec. 6, 1916, there remained only 1.47 miles of track construction to be done. The company has three single-truck open cars, two single-truck box cars and one double-truck box car. It now has an agreement with the Brockton & Plymouth Street Railway for the joint use of the latter's tracks to Plymouth, and expects to arrange for the use by the Brockton & Plymouth of the new track to Sagamore. At present the company has a carhouse of five-car capacity at Manomet, but plans to build a carhouse of eight or ten-car capacity in 1917 at Sagamore. Power is purchased from the Brockton & Plymouth Street Railway, but a connection will be made with the system of the Southeastern Massachusetts Power & Electric Company near Sagamore. The assets of the company on Oct. 31, 1916, totalled $360,651. The banking house of Hodgdon, Cashman & Company, Boston, has agreed to underwrite the construction notes of the company sufficiently to cover the contract price. In this case it has been urged that the words "reasonably sufficient financial arrangements," as shown in the statute, are equivalent to the words, "reasonably sound financial arrangements," and that the commission cannot properly issue the desired certificate if it appears that the construction of the road has been or is being financed largely by the creation of floating indebtedness and without the issue of stock sufficient in amount to insure a reasonable measure of financial stability to the enterprise. In the judgment of the board, the Legislature was endeavoring to insure, not the financial stability of the company, but the completion of a railway between Plymouth and Sandwich.

From the beginning it appears that the town of Plymouth has desired an opportunity to invest in the undertaking, not so much in the hope of securing a direct return upon the investment as to obtain the advantages of railway connection to the coastal territory lying immediately to the south, which included a region of summer-vacation popularity. The town was the petitioner for the above legislation. The commission certifies that reasonably sufficient financial arrangements have been made to permit the completion of the road.

Cleveland Power Contract Finding

Board of Arbitration Decides in Favor of Railway Purchasing Power from Illuminating Company

The board of arbitration selected two months ago to pass upon the Cleveland power contract made public its decision on Jan. 2. The board approved the power contract between the Cleveland Railway and the Cleveland Electric Illuminating Company. The plan of the railway to scrap its Cedar Avenue power house and build a substation at a cost of $250,000 was also approved. The decision on the latter points was announced some time ago. The cost of power to the railway under this contract will be less than 6 mills per kilowatt hour, according to the estimates made by the engineers at the hearings. The board stated that it considered the Illuminating Company's bid the lower of the two and the best under the circumstances.

The report stated that the bid of the local municipal light plant had not been approved by the board of control, as required by law; that it contained statements to the effect that the proposition was tentative and to be used as a basis for a more formal contract, and that it would be necessary to agree on conditions if the bid proved satisfactory. One of the principal reasons for the rejection of the municipal plant's bid was that the question as to whether it should be accepted was not included among those upon which the board was asked to pass. Moreover, the municipal plant proposed to furnish only the power which had been generated heretofore at the Cedar Avenue power house of the railway. This amounted to about 50,000,000 kw.-hr. per annum. The contract was arranged to extend over a period of ten years.

On the other hand, the Cleveland Electric Illuminating Company agreed to furnish not only this amount of power, but to continue that already being furnished to four substations, and as much more as may be required. The contract with this company is to cover a period of eighteen years. At the end of five years, however, the railway may receive competitive bids for the remainder of the term and if any bid received is 10 per cent lower than the price paid to the Illuminating Company and so low that this company will not meet it, then the railway may abrogate the contract on a year's notice.

The report said that if the primary and secondary charges alone were considered, the bid of the municipal plant for the service heretofore furnished by the Cedar Avenue plant was probably lower than that of the Illuminating Company. The municipal plant, however, could probably not furnish this power before July 1, 1918, while the Illuminating Company can furnish it by July 1, 1917.

There was considerable discussion of the clause by which the railway agreed to pay a certain proportion of the additional cost of coal above $2.25 per ton. The board criticized this, but said that the objections to it were not sufficient to overcome the advantages of other features of the contract. It recommended a modification of a clause relating to handling coal, and this will be made.

The reproduction value of the Cedar Avenue power house was placed at $1,265,565, and this, less the salvage of machinery and equipment estimated at $115,565, is to be placed in a suspense account and paid off at the rate of $20,000 a month.

It is estimated that the saving by buying the power heretofore furnished by the Cedar Avenue power house will be about $200,000 a year. The cost of production at the Cedar Avenue plant of the Cleveland Railway has been around 1 cent per kilowatt hour.

The report was signed by A. F. Ingersoll, chairman of the board and Warren Bicknell the member selected by the railway. Thomas L. Sidlow, the member selected by the city, brought in a minority report, in which many points of the majority report were discussed and criticized. He recommended the approval of the bid of the municipal plant as the more advantageous in every respect.

The total cost of the arbitration was $24,053. The arbitrators were awarded $5,000 each. Joseph Alexander, first selected by the company to represent it and afterward incapacitated by accident, received $1,000. The fees of city witnesses amounted to $4,665, while those of the company's witnesses were $858. The stenographer received $2,530.

Connecticut Company Review

Present Financial Condition Makes It Impossible for Company to Extend Service

The Connecticut Company, New Haven, Conn., in a brief which has just been filed with the Public Utilities Commission, announces that its present financial condition makes it impossible for the corporation to extend its service through Centerville, for which a petition was filed recently. The brief answers a petition for service in Hamden. The final hearing on the petition of the Hamden residents was held before the commission a few weeks ago.

The brief explains that the trustees of the Connecticut Company do not hold office in the same manner that the board of directors of street railways generally do. The men who handle the Connecticut Company affairs were appointed trustees of the property by the federal court and the tenure of office ends in 1919, giving them about two and a half years more service. The company said in part:

"Under these circumstances the trustees may very properly hesitate to make arrangements for the permanent financing of the company. The directors have followed the policy that the extraordinary expenditures be made out of current expenses, rather than permanently to finance the company and use the proceeds for the capital account. This policy has led the trustees to declare extremely small dividends during the last two years, paying last year a 1½ per cent dividend and the year previous, 1 per cent.

"It does not seem out of place at this time to mention a few of the larger expenditures which have been made during the past year, or are to be made during the present fiscal year, and the expenditures which have been recommended by officials but have not been approved by the board of directors at the present time.

"During the past year it has been necessary greatly to increase the capacity of the power houses in New Haven, Bridgeport and Hartford, upon which account is being spent the sum of $900,000. The carhouse in Waterbury is to be extended and rebuilt, for which an authorization of $200,000 has been granted. The building of bridges that are now under construction will result in a cost of $250,000 this year and bridges in contemplation will add $100,000 more to this account. For new passenger equipment it has been necessary in the last two years to form equipment trusts amounting to $1,100,000, which must be paid within five years. Paving of streets has averaged for the last three years an expenditure of $400,000 a year.

"Recommendations have been made by officials of the company for necessary carhouses, inspection barns, repair shops in various cities at an expenditure estimated at $1,150,000. These latter are very necessary in order to provide accommodations for the additional equipment.

"During the last five months of this fiscal year the total operating expenses have increased 31.58 per cent over the same period of last year. The gross earnings, however, have increased only 13.74 per cent, so that the net earnings have shown a decrease of 14.30 per cent, due to the enormous increase in the cost of maintenance and labor."

Report on Dorchester Tunnel Extension

The Boston Transit Commission has filed a special report in the Legislature relative to the extension of the Dorchester tunnel from Andrew Square to Upham's Corner. At the last session the commission was ordered to report upon the cost and most feasible route, and it finds the former to be about $2,800,000, via Boston Street, Edward Everett Square and Columbia Road, the distance being about 1 mile. An accompanying report by Chief Engineer Edmund S. Davis states that the present terminal at Andrew Square includes about 620 linear feet of two-track tunnel extending southerly from the station for cross-over facilities. The extension from this point to Upham's Corner would terminate at a station 350 ft. long with a lobby above the track level and the necessary entrances and exits. South of this station the usual cross-over facilities would be provided. The estimate takes into consideration the advanced cost of labor and material, the cost of the subway and station, including location of water pipes and sewers and land damages.

Lease Negotiations in Cincinnati

In a letter to E. W. Edwards, president of the Rapid Transit Commission of Cincinnati, Ohio, on Dec. 27, W. Kesley Schoepf, president of the Cincinnati Traction Company, expressed a willingness to enter into negotiations for the lease of the proposed rapid transit loop on the basis of a general proposition which had been presented to him. Mr. Schoepf said he would not object to a new franchise for his company, as proposed, on condition that it is so drawn as to leave no doubt as to its legality and to its practicability from a financial standpoint.

Instead of basing the returns on the net earnings of 1916, however, Mr. Schoepf made the counter-proposal that 1914, 1915 and 1916 be used for this purpose. He also said the company should deduct an amount equal to its 6 per cent franchise tax, before a division of any balance was made with the city, and he further contended that the percentage tax should not exceed the present payments. The company would agree to operate the loop as a part of a unified system, with universal transfers, entrance for all interurban lines, regulation of service and rates of fare, the city's right to order extensions and the fixing of a valuation for the purchase of the company's property by the city. Mr. Schoepf suggested that the zone of the 5-cent fare be limited to the present area. Through City Solicitor Charles A. Groom the canal lease secured by the city has been modified in such a way as to allow its use under somewhat different specifications than originally intended. It permits the city to build the rapid transit loop from 100 ft. beyond Brighton bridge to 300 ft. beyond Mitchell Avenue as an open way or on the surface instead of constructing it as a subway, as originally intended.

New Franchise Conditions in Gary

Proposed Substitute Grant Would Eliminate 3-Cent Fares and Make City a Partner

The segregation of the properties of the Gary & Interurban Railroad into its former constituent parts and a share of the net profits to the city of Gary, Ind., are provided for in a new franchise before the Council of that city. In return, the city of Gary will repeal the former fifty-year grant which exacted a 3-cent fare and grant a new thirty-year franchise. Should the company break faith with the city, the 3-cent fare will become operative again.

The segregation will restore the identity of the Valparaiso & Northern and the Chicago, Goshen & South Bend and connecting lines. The city of Gary demands that all lines east of Broadway in Gary be operated as separate companies. There is no objection to the old Gary & Interurban Railway, which also operates in Tolleston and Hammond, and the old East Chicago City Railways being one line.

Other conditions in the tentative grant provide for the addition at once of twenty modern pay-as-you-enter cars for service in Gary, all future track to be laid with 85-lb. rail, extensions of the road to new plants and to new sections of the city.

Plan to Consolidate Massachusetts Commissions

A struggle in the Legislature is forecasted by the recent action of Representative Allen of Newton, Mass., in filing a bill in the House providing for the consolidation of the Public Service Commission and the Gas & Electric Light Commission. Instead of the present boards aggregating eight members the bill provides a single body of seven members, to be appointed for terms of seven years at salaries of $7,500 each, with the exception of the chairman, whose compensation will be $8,000. The bill provides for the appointment by the chairman of four sub-boards of three members each, to deal respectively with steam railroads and steamships, street and elevated railways, gas and electric light companies, telephone and telegraph companies. The chairman and secretary of the commission are to be appointed by the Governor, the chairman having power to appoint the sub-boards and to name the chairman and secretary of each. According to the bill the decision of the sub-board is to be the decision of the commission. Previous efforts to consolidate the two commissions have failed on account of the absorption of both boards in their duties and the unbroken and successful regulative history of the Gas & Electric Light Commission in its particular field of service.

President House on Indefinite Leave

After Brief Rest He Will Study and Report to the Company Methods in Use Elsewhere Than Baltimore

At a special meeting of the directors of the United Railways & Electric Company, Baltimore, Md., on Jan. 3 William A. House, president of the company, was voted an indefinite leave of absence, and Thomas A. Cross, the vice-president, was selected to perform the executive duties while Mr. House is away. The official statement issued by the board follows:

"William A. House, at his request made to the directors of the United Railways & Electric Company, has been granted a leave of absence from official duties in order that he may secure, first, complete rest, after which he will engage in an investigation of the operation of a number of street railways in other cities. During his absence Mr. House will continue as president, but his duties will be performed by the vice-president, Thomas A. Cross.

"The directors realize that with the rapid industrial expansion of our city the company will be confronted with many serious problems of operation, and it is the desire of the directors that the company be in a position not merely to meet requirements, but to lead and assist in an intelligent policy of expansion and development.

"In order that they may have before them a thorough and competent study of what has been done elsewhere in the intelligent development of facilities to meet similar situations, the directors have decided to have made a report which will embrace the work done in most of the other large centers in this country.

"In considering means of making such a survey of the work elsewhere, different engineering firms were under consideration, but it was finally decided that it would be more satisfactory to have the report made by a man familiar with the local situation. The man pre-eminently fitted to make such a report is William A. House. Mr. House has been connected with the United Railways for the past thirty-five years, during which time he has not only seen the development of the company from a comparatively small beginning to its present magnitude, but during this time has been an important factor in the development and expansion of the company.

"In order to facilitate this work, and realizing that the exacting duties of the president of the company during the past years have taxed the strength of its president to the limit, and in order that he may be prepared to make the extensive tour of the larger cities involved in making the report in question, the directors of the company have granted a leave of absence to President House.

"It is the intention of the president for the first month to take a complete rest. The directors insisted that this should be done before his new duties were assumed. After his rest he will begin the inspection and examination into the railway situation in other cities. With the assistance of the report that will be made by President House, the directors of the company expect to develop comprehensive plans looking to meeting the future requirements of the local railway situation."

Toronto Carhouse Destroyed By Fire.—A fire broke out in the east carhouse of the Toronto (Ont.) Railway on the Don River at 8.30 p. m., on Dec. 28, causing total destruction of the building and many cars which were stored in the carhouse at the time. The loss is unofficially estimated at $500,000. R. J. Fleming, general manager of the company, refused to make any statement until the officials had made a complete examination and determined the exact loss.

Aurora Carhouse Roof Collapses. — As a result of splitting a switch upon entering the carhouse in Aurora, Ill., one of the cars of the Aurora, Elgin & Chicago Railway jumped the track and knocked down one of the columns supporting the roof, and the south half of the latter caved in. The construction was undoubtedly strong enough to support the roof under ordinary conditions without one column, but the excessive weight brought on by 8 in. of snow and ice was probably responsible for the failure. The truss rods buckled, and the roof gave way, burying five cars in the wreckage.

Arbitration of Wages on Interurban Line.—The trainmen in the employ of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., have agreed to submit their request for increased wages to a board of arbitration. The present basis of pay is 24½ cents for first-year men, the scale then ranging to a maximum of 28 cents. The company offered the men a flat increase of 2 cents an hour for the first year with an additional increase of 1 cent an hour for the other years. The trainmen asked 25 cents an hour for first-year men and 30 cents and 35 cents for the other employees. The working conditions that exist, other than the wage scale, are satisfactory.

Hearing on Jan. 15 on Relief from Franchise Conditions. —The State Public Service Commission of Washington has fixed Jan. 15 as the date for a hearing of the petition of the Tacoma Railway & Power Company, Tacoma, to be relieved of certain of its franchise obligations, which include the paving of right-of-way, and the payment of 2 per cent of its gross earnings to the city, because of impaired revenues due to jitney competition, and other reasons. The case is identical to that instituted by the Puget Sound Traction, Light and Power Company, Seattle, except that the Public Service Commission has made a valuation of the Tacoma Railway system, while it has not valued the Seattle system.

Grand Rapids Railway Raises Wages.—The third increase within a year in the wage scale of the employees of the Grand Rapids (Mich.) Railway was announced on Dec. 24 by Benjamin S. Hanchett, president, to become effective on Jan. 1. The scale is raised 4 cents an hour, bringing the new rate up to 28 cents for the first six months, 29 cents for the second six months, 31 cents for the second year, and 32 cents for the third year. The notice of the raise called attention to the fact that the earnings of the company did not justify the action at this time, but that the living expenses of the men had increased so materially that the company felt it necessary to assist in alleviating the conditions.

High Cost of Materials May Endanger Fare at Cleveland. —Fielder Sanders, street railway commissioner of Cleveland, Ohio, said that a decision of the board of arbitration in favor of the Cleveland Railway in the power contract controversy will result in a saving of $200,000 a year to the company and that this will meet the constantly advancing cost of labor, materials and equipment. In case the company does not receive this relief, he said, the fare would almost inevitably have to be increased to 4 cents cash and three tickets for 10 cents. Mayor Harry L. Davis is quoted as saying the city is opposed to an increase in fare, but Commissioner Sanders has answered this with the assertion that there is nothing else to do but stand for it, if the interest fund falls below the limit at which the fare is to be increased automatically under the Tayler franchise provisions.

Increases in Wages in Tacoma and Seattle.—Employees of the Tacoma Railway & Power Company, Tacoma, Wash., to the number of more than 300, received a Christmas present in the form of a rearranged wage schedule providing increases in pay approximating 2 cents an hour above the old wage scale. The new scale of wages ranges from 23 cents an hour for the first six months, up to 30 cents for ten years and thereafter. Trainmen operating one-man cars receive 2 cents an hour in addition to the above rates. Gripmen on cable cars receive 1 cent an hour in addition to the regular schedule. Trainmen while breaking in students receive 2½ cents an hour in addition to the regular schedule. Seattle employees of the Puget Sound Traction, Light & Power Company, which also controls the Tacoma Railway & Power Company, also received a Christmas present in the form of a wage increase, effective on Jan. 1, when the scale was increased 1 cent an hour above what it formerly was, to be followed by an increase of another cent on July 1, 1917. Nearly 1000 employees of the company are benefited by the Seattle increase.

Extension of Bridge Approach Underground.—At a conference of the city-planning commission of Cleveland, Ohio, recently, the matter of extending the eastern subway bridge approach on Superior Avenue to the Public Square was discussed, and it was decided to make an investigation with that end in view. Under present plans the entrance to the subway will be at West Sixth Street. Members of the commission believe that, with a moderate expenditure, the subway could be extended to the Public Square. This would relieve congestion and allow the cars greater freedom of operation. Such construction is also regarded as a first step toward subways on the various streets approaching this point and an underground terminal at the square. County Engineer Stinchcomb told President Stanley of the Cleveland Railway, Street Railway Commissioner Fielder Sanders and members of the street railway committee of the City Council that the county will not recede from its position in refusing to pay one-third of the expense of re-locating the street railway tracks in order to allow the construction of the subways to the bridge to proceed. He said the city had agreed to take care of this matter.

Programs of Association Meetings

National Foreign Trade Council

The National Foreign Trade Council has called the Fourth National Foreign Trade Convention to meet at the William Penn Hotel, Pittsburgh, Pa., on Jan. 25, 26 and 27, 1917, to consider, among others, the following questions:

Conditions in Foreign Markets After the War, and the Measures Necessary to Safeguard American Foreign Trade, as Well as the Foreign Trade Aspect of the American Tariff System.

Co-operation in Foreign Trade Development.

The American Merchant Marine.

Foreign Investment of American Capital as an Aid to Oversea Commerce.

Problems of the Smaller Manufacturer and Merchant.

All Americans engaged in, or desirous of entering, oversea commerce are invited to participate.

The proceedings will be designed to bring out the mutual interests of the chief elements in foreign trade. In addition to prepared addresses by authorities on topics mentioned, the convention will be given over largely to "group sessions," each devoted to intensive discussion of a single problem, in which all delegates are at liberty to participate. R. H. Patchin, Hanover Square, New York, is secretary of the National Foreign Trade Council.

American Wood Preservers' Association

The thirteenth annual meeting of the American Wood Preservers' Association will be held at the Hotel Astor, New York, N. Y., on Jan. 23, 24 and 25. The association will convene on Jan. 23 with an address of welcome by Mayor Mitchel of New York. In the afternoon reports of committees will be presented as follows: Publicity, Promotion and Education, by E. A. Sterling, chairman; Service Tests of Ties and Structural Timber, by C. P. Winslow, chairman; Terminology, by J. B. Card, chairman.

On Jan. 24 reports of committees will be presented as follows: Plant Operation, by A. L. Kuehn, chairman; Preservatives, by E. B. Fulks, chairman; Purchase and Preservation of Treatable Timber, by A. R. Joyce, chairman. On the same day the following papers will be presented: "The Grouping of Ties for Treatment," by C. P. Winslow, and "The Bad and the Good in the Handling of Wood," by J. H. Waterman.

On Jan. 25 reports of committees will be presented as follows: Service Tests of Wood Block Paving, by L. B. Moses, chairman; Wood Block Paving, by C. H. Teesdale, chairman.

An informal banquet will be held on the evening of Jan. 24 at 6.30 p. m. Special entertainment features will be provided for the ladies on all three days.

Financial and Corporate

Foreclosure Proceeding in San Francisco

Suit was filed in San Francisco, Cal., on Dec. 27 by the Anglo & London-Paris National Bank, the Oakland Bank of Savings, and D. A. Bulmore, as trustee, to foreclose the mortgage on the property of the Market Street Cable Railway, under which are secured $1,800,000 of 6 per cent bonds. The defendants are the Market Street Cable Railway, the United Railroads, the Union Trust Company, which is trustee for junior mortgages, and others.

The apparent objects of the suit are to prod along the reorganization of the United Railroads, the bondholders of which are not readily responding to the plan, and to prevent the junior bondholders from pleading the statute of limitations against this issue of $1,800,000. It was believed in the San Francisco financial district that, with the filing of this suit, it becomes imperative on the part of the holders of the $28,854,000 of United Railroads 4 per cent blanket mortgage bonds which are junior to these underlying mortgages, to take active steps to protect themselves, either by depositing their bonds under the present plan, or formulating a plan of their own.

Annual Report

Municipal Railway of San Francisco

An advance statement of the annual report of the Municipal Railway of San Francisco, Cal., contains the following income statement for the fiscal year ended June 30, 1916:

Operating revenues		$1,982,804
Operating expenses		1,164,617
Net operating revenues		$818,187
Legal and clerical service	*$9,182	
Depreciation (18 per cent of gross)	352,075	
		361,257
Operating income		$456,930
Income from bonds owned		24,038
Gross income		$480,968
Deductions from income:		
Taxes, comparison charges required by charter	$103,855	
Municipal franchise	59,149	
Municipal car license	2,955	
Federal income	755	
		*166,714
Balance before interest		$314,254
Interest on funded debt		239,486
Net profit		$74,768
*Comparison charter charges as above		175,896
Profit for year		$250,664

According to the advance statement, presented by Superintendent Thomas A. Cashin, the system has been maintained at better than 80 per cent of its reproduction cost. He warns the city, however, that although the road has been earning a surplus, there must be a conservative policy in undertaking costly and unprofitable extensions.

Heavy drains have been made upon the earnings of the municipal system which must be borne in mind, he points out. From surplus earnings $48,000 was expended on the Stockton Street Tunnel; about $84,000 was used to help complete the Church Street line; $25,000 is being appropriated for five motor buses to operate across Golden Gate Park, and the track construction through the Twin Peaks Tunnel, which will be required within a few months, will probably cost $275,000. Thus a total of $428,000 has been taken bodily out of the earnings of the system. The Church Street line, for which a total of $500,000 has been spent, is not operating, and thus earnings are not accruing to defray interest on the investment. The Chestnut Street line, built to handle Exposition traffic, will not be profitable until the district is built up. Moreover, some of the cross-town lines which it is necessary to maintain are being operated at present in expectation of greater development in the future.

Bond redemptions, Superintendent Cashin adds, will increase this year from $100,000 to $202,000 annually, and as long as the system is required to pay its own way out of earnings and at the same time maintain a high state of efficiency, projected extensions and other expenses must be carefully watched if "the garment is to be cut according to the cloth." Although the complete financial report for the year has not yet been put in shape for circulation, it is stated that the net profit of the municipal line for the year is $74,768, after deducting state and municipal franchise, municipal car license and federal income taxes. In other words, the actual profits total $250,664, which amount is now actually in the city treasury.

Arkansas Valley Interurban Railway, Wichita, Kan.—The Arkansas Valley Interurban Railway has been authorized by the Public Utilities Commission of Kansas to issue $1,000,000 of first mortgage 5½ per cent gold bonds; $600,000 of preferred stock and $1,500,000 of common stock. The company is to retire $1,303,000 of bonds authorized by the Railroad Commission in 1910, using for such retirement the proceeds of $900,000 of the new bond issue and $500,000 of the preferred stock. The proceeds of the other issues are to go for improvements.

Bartlesville (Okla.) Interurban Railway.—Edward V. Kane & Company, Philadelphia, Pa., announce that the $250,000 of Bartlesville Interurban Railway first mortgage 6 per cent gold bonds, due July 1, 1934, which they placed in 1910, were called for redemption at 102 and interest on Jan. 1, 1917. The same firm has purchased a new issue of $350,000 of Bartlesville Interurban Railway first mortgage sinking fund 6 per cent gold bonds, dated Jan. 1, 1917, due Jan. 1, 1947, and redeemable any time at 102 and interest. Practically all the old bonds will be exchanged for the new issue. Bonds not exchanged will be offered to the public at 100 and interest. The new bonds are a first lien on railway, light and power property in Bartlesville, having a replacement value of $583,000 as compared with $350,000 of outstanding bonds. All of the stock of the Bartlesville Interurban Railway is owned by the Cities Service Company.

Boise (Idaho) Railroad, Ltd.—H. E. Dalton, general manager, has been appointed receiver of the Boise Railroad, Ltd., which operates 8 miles of local lines in Boise. A sale was ordered by the court for Jan. 3, at a minimum price of $182,000. The application for a receiver, which was made by the Germantown Trust Company, Philadelphia, trustee under a mortgage securing $389,000 of bonds, was noted in the ELECTRIC RAILWAY JOURNAL of Aug. 19.

Bristol (Tenn.) Traction Company.—Upon a hearing of the bill of complaint of the Munsey Trust Company, trustee, in a suit in chancery instituted against the Bristol Traction Company, Judge Roberts of the Corporation Court of Bristol, Va., on Dec. 8 appointed Fred Dulaney and Joseph A. Caldwell receivers of the company. The same action was taken in the Chancery Court in Bristol, Tenn. The deed of trust under which application for a receiver was made was executed to secure payment of thirty-year gold bonds aggregating $300,000, but the bill recited that bonds in the total amount of only $200,000 were ever issued, $7,500 of which the defendant itself owns. On Sept. 1, 1916, the defendant defaulted in the payment of the semi-annual installment of interest on the outstanding bonds of $192,500. The complainant filed as an exhibit to its bill a copy of a report which B. L. Dulaney, president, recently made to the board of directors of the company, showing that after paying taxes and interest on its bonds his company operated in both Bristols at a total loss of $8,652 during the fiscal year ended June 30, 1916.

Chicago (Ill.) City Railway.—The First Trust & Savings Bank and the Illinois Trust & Savings Bank, Chicago, Ill., have purchased an issue of $1,700,000 of first mortgage 5 per cent bonds of the Chicago City Railway. The proceeds from the sale of these bonds will be used to reimburse the company for improvements which have been made by it and for which the purchase price to the city is raised.

Chicago (Ill.) Elevated Railways.—Officials of the Chicago Elevated Railways have announced that the interest

on such of the $14,000,000 of two-year 5 per cent secured gold notes of the company, dated July 1, 1914, as have not been extended under the terms of the extension agreement of June 19, 1916, will be payable at the office of the National City Bank in New York City for the six months ended Dec. 31, 1916, at the rate of 5 per cent per annum. It is stated that practically all of the notes have gone into the agreement.

Cincinnati & Columbus Traction Company, Cincinnati, Ohio.—The sale of the property of the Cincinnati & Columbus Traction Company, which was scheduled to take place on Dec. 19 at an upset price of $850,000, failed to be carried through on account of a lack of bidders. It is expected that the court will order a revaluation, and the property will again be offered for sale. Were it not for the unsettled condition of the loop question and an interurban right-of-way into Cincinnati, it is said, the stockholders would be prepared to buy in the property at once. The railway was placed in the hands of the Union Savings & Trust Company, Cincinnati, as receiver on account of flood damage in 1913.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—The application for a receiver in the case of the Gary, Hobart & Eastern Traction Company, noted a few months ago in the ELECTRIC RAILWAY JOURNAL, has been granted, Judge Wildermuth receiving the appointment.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The application for a receiver for the Kansas City, Kaw Valley & Western Railway, noted in the ELECTRIC RAILWAY JOURNAL of March 11, 1916, was dismissed by order of the court, according to official information now available.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—Howard Abbott, master in chancery, has been ordered by Judge Wilbur F. Booth, in the United States District Court at Minneapolis, Minn., to sell the property of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company at auction on or before May 27, 1917.

Monongahela Valley Traction Company, Fairmont, W. Va.—An extra stock dividend of 6 per cent has been declared by the directors of the Monongahela Valley Traction Company on the $6,782,037 of common stock, along with the regular quarterly dividend of 1 per cent. Both of these dividends are payable on Jan. 15 to holders of record of Jan. 5. The regular quarterly 1¼ per cent on the preferred stock of the company has also been declared, payable on Feb. 1.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—The Nashville-Gallatin Interurban Railway has been placed in a receivership upon the petition of H. H. Mayberry, the controlling stockholder in the property, whose bill filed with the court alleged that interest due on July 1, 1916, on the $600,000 of first mortgage bonds of the road is in default. H. H. Corson and James R. West were appointed receivers, and creditors were ordered to file their claims before July 1 next. The receivers were authorized to issue $20,000 of 6 per cent receivers' certificates to mature in six months, and to use the proceeds to pay the bond interest to prevent foreclosure. It is believed, according to the bill of complaint, that a sacrifice of the property will be thus prevented, and that the company will be able to work out of its financial difficulties. The railway is 27 miles long from Nashville to Gallatin.

Northern Ohio Electric Corporation, Akron, Ohio.—The Public Utilities Commission of Ohio on Dec. 29 authorized the Northern Ohio Traction & Light Company to issue $1,000,000 of additional common stock, from the proceeds of which a number of improvements will be made. The new stock will be taken by the parent corporation, the Northern Ohio Electric Corporation.

Orleans-Kenner Electric Railway, New Orleans, La.—The application for a receiver for the Orleans-Kenner Electric Railway, made several months ago, was promptly thrown out of court. In connection with present advice to this effect, it is stated that the company is in fine shape and is doing well.

People's Street Railway of Nanticoke & Newport, Wanamie, Pa.—The application for a receiver for the People's Street Railway of Nanticoke & Newport, noted several months ago in these pages, is still formally in court, but there is said in official circles to be no reason why the property should be placed in receivership. The application was made by a few dissatisfied minority stockholders. The company is said to be in a very sound financial condition, interest on $73,500 of outstanding bonds always having been met as required, and liberal dividends having been paid on $100,000 of stock since 1910.

Pittsburgh & Butler Railway, Pittsburgh, Pa.—The Pittsburgh Trust Company was named on Jan. 2 as receiver of the Pittsburgh & Butler Railway. The railway defaulted in November, 1914, in the payment of interest on the $1,500,000 of first mortgage 5 per cent gold bonds of the Pittsburgh & Butler Street Railway of which the Pittsburgh Trust Company is trustee. Subsequent interest payments were not made and a bondholders' protective committee was appointed. The Pittsburgh & Butler Railway was organized in March, 1914, as a consolidation of the Pittsburgh & Butler Street Railway and the Butler Passenger Railway.

Sapulpa & Interurban Railway, Sapulpa, Okla.—The recent newspaper report that the Midland Valley Railroad, a steam line with main offices in Philadelphia, has purchased the Sapulpa & Interurban Railway is declared to be erroneous. The property of this 12-mile electric railway was foreclosed and bought in by the bondholders on Sept. 9 and the receivership was discharged. The former receiver, R. V. Miller, however, is still in charge of the property for the new owners. There will probably be a reorganization soon, but as yet nothing has been done. As far as is known, there is no probability that the Midland Valley Railroad will acquire the property.

Southern Traction Company, Inc., Bowling Green, Ky.—The application for a receiver in the case of the Southern Traction Company, Inc., made by a director a few months ago, has been denied, according to official information now at hand.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—In a joint application filed with the Ohio Public Utilities Commission on Dec. 26, the Ohio River Power Company proposes to lease that portion of the property of the Steubenville & East Liverpool Railway & Light Company which is utilized in carrying on the electric light and power business of the Ohio River Power Company. The proposed lease is to run until Oct. 1, 1919, at a rental of $90,000 a year, with the privilege of purchasing the property for $1,500,000. A notice of a special meeting of the stockholders of the railway and light company to act on the lease was published in the ELECTRIC RAILWAY JOURNAL for Nov. 18, page 1079.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—An initial dividend of 1 per cent was paid on Dec. 21 to the holders of the common stock of the Youngstown & Ohio River Railroad of record of Dec. 16. The company also paid on Dec. 21 to holders of record of Dec. 16 a dividend of 1 per cent on the preferred stock on account of accumulations, together with the regular quarterly dividend of 1¼ per cent.

York (Pa.) Railways.—A dividend of 2½ per cent has been declared on the preferred stock of the York Railways on account of accumulations, along with the regular quarterly 1¼ per cent, both payable on Jan. 30 to holders of record of Jan. 20. The accumulations in dividends on this stock have now all been met.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Boston (Mass.) Suburban Electric Companies, 50 cents, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Citizens Traction Company, Oil City, Pa., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common; 6 per cent on common payable in common stock.

Rome Railway & Electric Company, Rome, Ga., quarterly, 1 per cent.

Stark Electric Railroad, Alliance, Ohio, 1 per cent.

Warren & Jamestown Street Railway, Warren, Pa., 3 per cent.

Western New York & Pennsylvania Traction Company, Olean, N. Y., 3 per cent, first preferred.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

York (Pa.) Railways, quarterly, 1¼ per cent, preferred; 2½ per cent on preferred in full of all accumulations.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$18,509	*$8,319	$10,190	$3,532	$6,658
1 " " '15	18,096	*9,670	8,426	2,204	6,222
12 " " '16	208,536	*102,548	105,988	40,285	65,703
12 " " '15	187,957	*109,873	78,084	25,674	52,410

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$9,964	*$9,306	$658	$1,128	†$470
1 " " '15	9,405	*7,855	1,550	1,106	444
12 " " '16	121,336	*106,240	15,096	13,264	1,832
12 " " '15	115,316	*97,162	18,154	13,563	4,591

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, NOVA SCOTIA

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$36,466	*$18,205	$18,261	6,568	$11,693
1 " " '15	34,152	*16,891	17,261	6,606	10,655
12 " " '16	387,757	*227,251	160,506	78,470	82,036
12 " " '15	347,773	*205,637	142,136	79,289	62,847

COLUMBUS (GA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$84,786	*$30,405	$54,381	$28,572	$25,809
1 " " '15	67,214	*28,135	39,079	28,730	10,349
12 " " '16	847,466	*343,413	504,053	343,883	160,170
12 " " '15	706,911	*324,245	382,666	344,769	37,897

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$72,130	*$37,862	$34,268	$8,759	$25,509
1 " " '15	71,664	*35,193	36,471	8,715	27,756
12 " " '16	817,842	*435,548	382,294	106,336	275,958
12 " " '15	694,754	*380,106	314,648	105,056	209,592

EL PASO (TEX.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$104,990	*$55,576	$49,114	$5,286	$44,128
1 " " '15	84,807	*43,932	40,875	4,202	36,673
12 " " '16	1,088,443	*633,775	454,668	56,891	397,777
12 " " '15	967,036	*515,683	451,353	50,371	400,982

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$171,761	*$107,012	$64,749	$36,858	$27,891
1 " " '15	174,258	*103,652	70,606	36,124	34,482
12 " " '16	1,929,671	*1,231,365	698,306	438,617	259,689
12 " " '15	1,992,280	*1,199,804	792,476	432,963	359,513

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
-m., Oct., '16	$25,956	*$15,756	$10,200	$5,240	$4,960
1 " " '15	23,033	*13,053	9,980	5,522	4,458
12 " " '16	320,263	*181,911	138,352	64,478	73,874
12 " " '15	268,003	*160,261	107,742	66,681	41,061

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Nov. '16	$512,904	*$224,107	$288,797	$215,702	$73,095
1 " " '15	477,687	*197,256	280,431	212,253	68,178
5 " " '16	2,397,008	*1,084,185	1,312,823	1,075,132	237,691
5 " " '15	2,246,309	*956,673	1,289,636	1,059,286	230,348

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$49,646	*$34,930	$14,716	$15,437	†$721
1 " " '15	51,338	*35,896	15,442	14,735	707
12 " " '16	619,387	*422,793	196,594	182,308	14,286
12 " " '15	617,722	*431,913	185,809	174,675	11,134

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$26,437	*$17,390	$9,047	$7,241	$1,806
1 " " '15	25,312	*15,336	9,975	7,511	2,464
12 " " '16	310,557	*203,171	107,386	87,075	20,311
12 " " '15	289,478	*180,484	108,994	91,595	17,399

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$21,439	*$12,319	$9,120	$7,714	$1,406
1 " " '15	22,385	*13,025	9,360	7,082	2,278
12 " " '16	279,557	*154,898	125,159	91,217	33,942
12 " " '15	249,556	*146,262	103,294	86,375	16,919

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Earnings
1m., Oct., '16	$82,457	*$43,762	$38,695	$4,263	$34,432
1 " " '15	84,803	*42,938	41,865	4,212	37,653
12 " " '16	964,328	*527,078	437,250	52,269	384,981
12 " " '15	978,005	*498,264	479,741	52,503	427,238

*Includes taxes. †Deficit.

Traffic and Transportation

Decision in Grafton Fare Case

Commission Finding Contains Discussion of Economics of Country Line Transportation

The Public Service Commission of Massachusetts has reached a finding in the Grafton fare case, on the Worcester Consolidated Street Railway, to the effect that a reduction in rates is justified on this branch of the system radiating from Worcester. As the company, after conference with the commission, has agreed to furnish special tickets on the line good between the hours of 6 a. m. and 8 a. m. and 4.45 p. m. and 6.45 p. m., the petition of citizens of Grafton for lower cash fares is placed on file. The finding contains a discussion of the economics of transportation on country lines radiating from Worcester and is abstracted below.

The petitioners alleged that the fares charged by the company for the transportation of passengers through Grafton, viz., two fares of 5 cents each for passage in one direction, were excessive. The distance from Worcester City Hall to the end of the line in Grafton Center is 8.90 miles. From the City Hall a passenger can ride 4.79 miles for 5 cents, 7.47 miles for 10 cents, and 8.90 miles for 15 cents, without allowance for the transfer privilege at Worcester. The line in Grafton is 4.77 miles long and the fare is 10 cents.

The petitioners requested a reduction largely on the ground that the fares they are paying are relatively higher than those prevailing upon other and similar lines radiating from Worcester. On twelve routes out of Worcester the distance available on a 10-cent cash fare from the center of Worcester ranges from 6.04 to 10.33 miles, and on ten of these routes the distance available on a 15-cent cash fare varies from 7.98 to 13.3 miles. On the Holden route a concession is given in the form of 10-cent tickets good in the morning and afternoon rush hours between Holden and Worcester City Hall and giving a ride of 10.16 miles, by former order of the commission. There are no transfer privileges in Worcester with these tickets. Other tickets are in vogue on the Spencer and Bramanville lines. The commission held that the fact that the above inequalities existed was not conclusive evidence in favor of the petitioners. Similar apparent irregularities were to be found upon most of the Massachusetts street railways. Fares had been established strictly on a mileage basis, but had been influenced by other factors, such as the location of centers of population, municipal boundary lines and traffic density. Cost of service was by no means solely dependent upon mileage. An attempt to readjust street railway fares within the State upon a uniform mileage basis would mean revolutionary changes probably in general unsatisfactory to all concerned.

A tabular exhibit of maximum distances was likely to be misleading. Thus: if on a certain line the maximum distance for a 10-cent fare was 8 miles and for a 15-cent fare, 12 miles, the principal settlement in the 15-cent zone might be at the 9-mile point, so that very few local riders had the benefit of the maximum distance. The company contended that a situation similar to this existed on many of the routes radiating from the Worcester City Hall. On nearly all the suburban lines except the Grafton line very few persons lived in the vicinity of the 10-cent fare limit. Hence if that fare limit was extended for a considerable distance into the country on those lines, it would not materially affect the income of the company, as the through passengers would pay the fare anyway. A reduction of the fare to 10 cents in the case of the Grafton line would result in a very considerable loss for the street railway and give to persons located at the large settlement a privilege and advantage that was not accorded to any considerable number of people on any other suburban line. If the Grafton line did not end at Grafton Center, the 15-cent fare limit might be placed at a point more nearly conforming to the similar distances on the other routes without any real benefit to the people living at the Center.

The company paid dividends of 5.5 per cent on its stock in 1915 and 5 per cent in 1916. In this case no attempt

was made, either by the company or the petitioners, to segregate investment in the Grafton line and pro-rate revenues and operating expenses so that the financial results from operation might be determined with approximate accuracy. It was claimed by the petitioners, however, that the line was one of the better paying suburban routes. The company did not refute this. The commission knew of no uniform and inflexible rule to apply with general public advantage in cases where comparative street railway fares were involved. The factors that apply were so numerous and varied that each case must be determined on its own merits. The commission found that an adjustment by means of special tickets was equitable. The company has agreed to furnish tickets good during the hours above mentioned at 10 cents each for the use of regular patrons traveling between any part of Grafton and the terminus of the line at Salem Square, Worcester.

Car Capacity Measure Amended

Board of Health Order Will Not Apply Where Full Track Capacity Is Utilized

Two years ago, through the initiative of Dr. S. S. Goldwater, then Commissioner of Health of New York, an order was issued by the Board of Health against certain car lines in the boroughs of Manhattan, Brooklyn and Richmond, forbidding them to carry in any car passengers to a number exceeding one and one-half times the seating capacity of such car. The application of the order led to strong denunciation of the board's orders and to a demand for their repeal. On the other hand, the Board of Health felt that the duties imposed upon it by the charter demanded that the efforts to improve the hygienic conditions prevailing in the transportation service be continued, to the end that the health menace might be reduced to the minimum.

In order that the department might have the advice and guidance of others experienced in this field, a meeting of the advisory committee on traffic sanitation was held in the office of the commissioner of health, on Dec. 15. At this meeting, there were present the Mayor, John Puroy Mitchel, Deputy Police Commissioner Guy A. Scully, City Chamberlain Milo R. Maltbie, Commissioner of Plant and Structures F. J. H. Kracke, Public Service Commissioner Henry W. Hodge, Daniel L. Turner, engineer of the Public Service Commission; Jacob C. Klinck, president of the Brooklyn Civic Club; J. S. Doyle, of the Interborough Rapid Transit Company; R. A. Shaw of the Brooklyn Traffic Committee of One Hundred; Alexander McKinney, William J. Millard, assistant corporation counsel; Max W. Weir, for the Merchants' Association, and Dr. John Franklin Crowell, for the Chamber of Commerce.

For the information and guidance of the meeting, attention was called to Sec. 1169 of the charter, which requires the Board of Health to aid in the enforcement of and, so far as practicable, to enforce all laws of the State applicable in New York City, to the preservation of human life or to the care, promotion or protection of health. Section 1172 of the charter empowers the Board of Health to amend the sanitary code and to publish therein additional provisions for the security of life and health in the city of New York.

After considerable discussion, the committee decided that overcrowding could be prevented to a very great degree if the full track capacity of all the lines was used, as far as practicable, to meet the demand of the traveling public. It was agreed that when the operating companies were using to the full all the available facilities which the public allows them, it would be unreasonable to demand that they exclude excess passengers from their cars. The committee suggested that the Board of Health meet this situation by revoking the existing orders and adding the following section to the sanitary code:

" 'Sec. 306. Cars Not to be Overcrowded. The carrying of passengers on railroad cars in the city of New York shall be so regulated at all times that the number of passengers on any such car at any time shall not exceed one and one-half times the seating capacity of the car; provided, however, that the foregoing provisions of this section shall not apply when the full number of cars which shall have been ordered by the Public Service Commission to be operated on any line or part of a line are so operated; and provided, further, that the foregoing provisions of this section shall not apply, in the absence of such an order of the Public Service Commission, when the maximum number of cars which can be practicably operated on any line or part of a line are so operated.' "

The recommendations of the committee were submitted to the Board of Health at a special meeting held on Dec. 16, and the orders already referred to were revoked and Sec. 306, as just cited, was adopted as part of the sanitary code, to take effect immediately.

Storm Affects Traffic

Western New York Lines Tied Up—Cause of Delays Advertised

Traffic on electric lines throughout western New York was seriously delayed for several days following the freezing rain and heavy snow fall on Dec. 23, last. The sleet storm lowered wires and covered rails with heavy ice. No efforts were made to operate cars on the Buffalo & Lake Erie Traction line between Buffalo and points west, and several cars were abandoned along the line between Buffalo and Lackawanna. The schedules of the city lines in Buffalo were only partly maintained by the International Railway and service was completely suspended on several of the Niagara Falls local lines. Interurban traffic between Buffalo and Niagara Falls and Lockport was abandoned for a short time. Neglect on the part of the city to clean up the snow in the streets of Buffalo also caused much delay in operating lines.

In an effort to acquaint the public with causes of delay on the Buffalo city lines, the International Railway printed advertisements in the daily newspapers giving the time, place and cause for each delayed car. This departure on the part of the company caused much favorable comment. E. J. Dickson, vice-president of the company, also prepared a statement for the public which was printed in the daily newspapers giving the cause for the delays on the lines. He placed much of the blame for the delays on blockades caused by motor trucks, wagons, sleighs, etc., on the tracks.

Louisville Men Discuss Salesmanship

In presentation of their activities to them in the light of "Selling Rides," officials of the Louisville (Ky.) Railway have created much new interest in their work among the trainmen. The passengers are regarded differently than they used to be and the men are talking about the proposition some weeks after the meetings at which the subject was discussed. In the current issue of *Trolley Topics*, issued by the company, Motorman O. E. Allen is represented by the following on "Selling Rides":

"This is a subject composed of two small words but has a great meaning. It is an easy matter to sell something to eat, drink or wear, but when it comes to selling rides, it takes a first-class salesman to do business. We are up against hard competitors when it comes to selling rides, for we have many automobile owners who give rides away. Think what we would be up against if we were in a business selling groceries and our next-door neighbor was giving the same articles away. Do you think we would make many sales? When we make a sale let us do all in our power to make a satisfied customer and he will bring us more. If we sell a ride to one customer and he is dissatisfied he will not buy any more from us and will not stop there but will keep others from buying from us. I have noticed on several occasions where I was in sight of a station a passenger standing there; when the car approached within 100 to 150 ft. a machine would come along, and the man would get in; sale gone, not 5 cents either, but sometimes 25 or 30 cents. (Mr. Allen is on a country line.) Dissatisfied customers or bad salesmanship may be the cause of losing sale of the ride. Now let us all devote our energy to our sales and when we make a sale let it be a satisfied sale. Use all the politeness we have, especially to the aged and infirm, and see what an improvement it will make."

Buses for Municipal Railway

Announcement has been made by the Board of Public Works of San Francisco, Cal., that sealed proposals will be received on Jan. 31 for furnishing the city with from five to fifteen buses for uses in the transportation of passengers in conjunction with the Municipal Railway System. It is stipulated in the specifications that the actual seating capacity of each bus shall be nineteen passengers, with a total carrying capacity of thirty passengers.

The proposals which have been sent out also call for bids for the maintenance and upkeep of buses ordered by the city during a run of 125,000 miles. As the estimated daily run of each machine will average about 125 miles, this means that the successful bidder will be obliged to maintain the upkeep of each machine taken by the city for a period of about three years. The estimated cost of the machines is about $5,000 each.

While the original idea was to purchase only sufficient buses to operate across Golden Gate Park into the Sunset District from the present Tenth Avenue terminal of the Municipal Railway System, the proposition advanced by the Harbor Commission that the city operate a line along the harbor front over a smooth roadway to be constructed by the State may mean the purchase by the city of the full complement of fifteen machines.

Fall River Ticket Withdrawal Postponed. — The Public Service Commission of Massachusetts has issued an order postponing the proposed withdrawal from sale by the Bay State Street Railway of strips of six tickets for 25 cents in the city of Fall River until Feb. 1, 1917.

Low Freight Damages of Louisville Interurban Line.— Losses and damage charges against the freight service of the Louisville & Interurban Railway, Louisville, Ky., are less than one-fifteenth of 1 per cent of the receipts. R. H. Wyatt, general freight agent of the company, is quoted as claiming that this record cannot be excelled by that of any other similar service.

Windows Replace Curtains in San Francisco Cars.—The curtains which have thus far been used to protect the open sections of cars of the San Francisco (Cal.) Municipal Railway, have been replaced by glass windows. This change excludes rain and has decided advantages over the fully inclosed cars, which are not so popular. The change is costing about $40 a car.

Kansas City Rate Hearing on Feb. 15.—A hearing on suburban street railway rates on the lines of the Kansas City Railways will be held in Kansas City, Mo., on Feb. 15 by the Public Service Commission of Missouri. Because of a controversy over certain suburban rates, the company had asked the commission to take up the entire matter and establish a basis for future ratemaking on the suburban lines, possibly on the mileage plan.

Increase in Fare on New Jersey-Pennsylvania Line.—The Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., has placed a new schedule of fares in effect between Morrisville and Torresdale, Pa. The through trip fare between these two towns has been increased from 25 cents to 35 cents. The rate from Torresdale to Cornwells and Eddington remains unchanged, as does the rate from Bristol to Croyden, Eddington, Cornwells and Edgely.

Numbered Stops on Trenton Suburban Line.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has had sheet-iron tags hung from the wires at about eighty stops along its Hopewell line. Each tag is numbered, and passengers now inform the conductor at what number they want to alight from the car. The signs also show just where the cars stop to take on passengers along the country districts. A number of old stops has been eliminated.

Tulsa Service Increased.—The Tulsa (Okla.) Street Railway has increased its service by placing conductors on all its cars. When the jitneys made inroads into the company's business several months ago, the company was forced to curtail expenses, and in addition to reducing the number of cars in operation the company resorted to one-man cars. Since the City Commission of Tulsa adopted adequate legislation for the jitneys the business of the Tulsa Street Railway has more than doubled.

Sliding Gates Considered for Manhattan Elevated Lines. —The Public Service Commission for the First District, New York, is attempting to get the Interborough Rapid Transit Company to improve the type of platform gate used on its trains on the Manhattan elevated lines. At a hearing held last week, George Keegan, assistant to the vice-president and general manager, promised the commission that he would within a short time submit drawings of a type of sliding gate to be placed on the outside of the cars which the company would be willing to install upon two or three trains for the purpose of experiment. Experts of the commission testified at the hearing that the installation of folding and collapsible gate devices on Manhattan elevated lines would undoubtedly serve to improve conditions materially.

Legislating Against the Dallas Jitney.—The jitney traffic ordinance drafted by the city attorney at the instance of the Mayor and the City Commissioners of Dallas, Tex., seems likely to be finally adopted. This ordinance, which is a general traffic law, provides that each jitney in Dallas shall give an indemnity bond in the sum of $2,500 to protect passengers and the public. The ordinance also limits the number of passengers to be carried by a jitney to its seating capacity. The demand for more stringent regulatory measures affecting jitneys arises from the numerous accidents. Since Jan. 1, 1916, two persons have been killed, forty-five persons seriously injured and 173 persons slightly injured. It is estimated that more than 100 minor accidents were not reported to or by the police. The jitney drivers declare that the ordinance will put them out of business. They maintain that the cheapest bond which will meet the city's requirements will cost them $250 a year. The jitney driver now pays annual fees of approximately $100. This he considers prohibitive.

Discharges Follow Inability to Sense Organization Spirit. —The Kansas City (Mo.) Railways has during the eleven months since the new organization took charge, gradually installed many features of welfare work, insurance, social intercourse, athletics, and safety, in addition to the departments that make for greater efficiency in maintenance and operation. In each case of thoughtful provision for the personal good of the employees, the response has been grateful and immediate. The ideals of the company having been pretty thoroughly disseminated, the time arrived when the problem presented itself of dealing with those who did not and could not respond to these ideals. As a first move the company in December discharged sixteen men, most of them for violation of the spirit of the safety rules. These were all cases wherein it was apparent that the men were not in sympathy with the safety policies of the company, and could not get into sympathy with them. A few of the discharges, however, were on account of deception, with respect to misstatements as to accidents. Nine collisions occurred one day, and this startling number was made the occasion for the first demonstration on a considerable scale that discipline was an essential feature of the new regime.

New Medium Between Company and Public in New York. —*Interborough Rapid Transit* is the name of a new bulletin just issued by the Interborough Rapid Transit Company, New York, N. Y. The new paper, which will be published from time to time, as constantly arising questions demand it, has long been contemplated as a medium of expression between the company and the public, while, on the other hand, the *Interborough Bulletin* and the *New York Railways Employees' Magazine* already serve as mediums of communication between the companies and their employees. The circulation of the new magazine will depend upon the subject matter handled, i. e., it will be mailed to those individuals and organizations who would seem at the time to be most interested in the subject under discussion. The front page of the first issue, dated Dec. 20, 1916, contains a graphic representation of the tremendous growth of the traveling habit in New York from 147 rides per annum per person in the horse car days of 1872, to 332 rides per person on the subway, surface and elevated lines in 1916. The paper also enumerates and describes the numerous and costly safety devices which have been installed in the subway, such as safety platforms, safety signal system, door signals, extra lighting system, electric fans and white enameled car ceilings for better lighting.

Personal Mention

Charles Ruff has been appointed master mechanic of the Lincoln (Neb.) Traction Company.

B. W. Hilliard has been appointed superintendent of transportation of the Lincoln (Neb.) Traction Company.

C. R. Phenicie, vice-president of the Wisconsin Public Service Company, Green Bay, Wis., has been elected vice-president of the Manitowoc & Northern Traction Company, Manitowoc, Wis.

Charles E. Miller, who has been bookkeeper for the Marion & Bluffton Traction Company, Bluffton, Ind., for several months, has been appointed auditor of the company. Mr. Miller entered upon his new duties on Jan. 1.

Lawrence I. Grinnell, who went to the Border in July, 1916, as a member of Troop D, Squadron A, New York National Guard, has been mustered out of active service and has resumed his position as a member of the editorial staff of the ELECTRIC RAILWAY JOURNAL.

J. G. Miller has been appointed local manager of the Manitowoc & Northern Traction Company, Manitowoc, Wis., to succeed Thomas Higgins, resigned. Mr. Miller was born and educated in Milwaukee, is a civil engineer by profession, and was formerly in electric railway work in San Antonio, Tex. Mr. Miller for the past year has been civil engineer for the Highway Commission in construction of roads about the city of Milwaukee. The property at Manitowoc was taken over recently by the Clement C. Smith interests.

Charles A. Drummond has been appointed assistant publicity agent of the Detroit (Mich.) United Railway and assistant editor of *Electric Railway Service*, which is published in the interest of the railway. Mr. Drummond was for many years on the editorial staff of the Detroit *Journal* and for the last year and a half was city editor of that paper. He succeeds with the Detroit United Railway A. H. Sarvis, who resigned in November to become a member of the executive staff of the Flint Varnish & Color Works.

Melodia Blackmarr Jones, widow of Capt. Joseph T. Jones, president of the Niagara Gorge Railway, Niagara Falls, N. Y., the Gulf & Ship Island Railroad, Gulfport, Miss., and the Gulfport & Mississippi Coast Traction Company, has been elected active president of the Gulf & Ship Island Railroad. It is reported Mrs. Jones will also have charge of the Gulf & Mississippi Coast Traction Company. No announcement is made as to who will assume the presidency of the Niagara Gorge Railway, of which Burt L. Jones is general manager.

T. Lee Miller, since last August assistant to the president of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has resigned to accept a position with a New York banking firm. Mr. Miller was graduated from Cornell University with the degree of mechanical engineer. Immediately after graduation he became connected with the firm of Marwick, Mitchell & Company, New York, efficiency and cost engineers. Upon leaving the last-named firm he entered the service of the Toledo Railways & Light Company, Toledo, Ohio, as assistant to F. R. Coates, president. He resigned from that company in 1915 to become New York manager of sales of the Sangamo Electric Company. It was from this company that Mr. Miller resigned to become connected with the Fort Wayne & Northern Indiana Traction Company.

Charles Currie, who retired as vice-president and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, on Dec. 31, was born in Toronto, Ont., on March 8, 1868. At the age of fourteen he entered the employ of the London (Ont.) Street Railway as an office boy. This was in the horse-car days, and, although Mr. Currie's activities were always in the office end of the business, he had an opportunity of coming in contact with very many operating and construction problems. He rose through the office ranks as clerk, cashier and auditor, after which he became secretary of the company. In 1896 he was called to Lima, Ohio, as general manager of the Lima Railway. Three years later he resigned from the company at Lima to become general superintendent of the Cleveland (Ohio) Electric Railway. In this position he handled successfully a very serious strike. Mr. Currie became general manager of the Detroit & Toledo Shore Line, operating between Detroit and Toledo, in 1901, with headquarters at Detroit. He was then asked by the Everett-Moore syndicate to take the position of vice-president and general manager of the Northern Ohio Traction & Light Company, which had been organized only a short time before to take over the Akron, Bedford & Cleveland interurban line, the Akron city lines and several suburban lines. This connection continued fifteen and one-half years and witnessed the development of the property to one of the most modern and complete utilities of its kind in the United States. During Mr. Currie's administration at Akron other lines were added to those originally owned by the company, including the Canton-Akron, Canton-Massillon and Canton-New Philadelphia interurban lines and the Canton and Massillon city lines, making a consolidated property of 264 miles of track. The power developments of the company alone in the last five years involved an investment of more than $3,000,000. The Northern Ohio Traction & Light Company was one of the first to place limited cars on interurban lines and to demonstrate the possibilities of this service. In 1913 Mr. Currie spent three months in Europe studying the electric railway developments on the continent and in the cities of England and Scotland. With this exception he was never away from his desk for any length of time in the more than fifteen years' service with the company. On the sale of the property recently to Hodenpyl, Hardy & Company and E. W. Clark & Company Mr. Currie declined a proposal that he remain in active charge, but agreed to continue with the company as a director.

Obituary

Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., died on Dec. 30 of pneumonia following an operation for appendicitis. Mr. Whitridge, who was responsible for lifting the Third Avenue system out of receivership into a paying system, and whose recent controversy with the labor unions during the car strike brought him into prominence, was born in New Bedford, Mass., on Aug. 8, 1852. He was graduated from Amherst College in 1874 and in 1877 received a master of arts degree from the same institution. Mr. Whitridge was admitted to the bar of New York in 1879; and after that time practised in New York, devoting part of his time to lecturing at Columbia University on administrative law and constitutional and political history. In 1906, on the occasion of the coronation of King Alfonso of Spain, Mr. Whitridge represented the United States as special ambassador. The work of rehabilitating the physical property of the Third Avenue Railroad, which Mr. Whitridge directed as receiver of the company until he became president in 1912, is well known through the articles which have appeared in the ELECTRIC RAILWAY JOURNAL from time to time. While Mr. Whitridge was receiver of the Third Avenue Railroad his frequent tilts with the Public Service Commission of the First District enlivened the proceedings before that commission and his correspondence with that body was voluminous. This correspondence Mr. Whitridge subsequently published at his own expense. Besides being an author of numerous pamphlets, Mr. Whitridge wrote several books on legal, historical and other subjects, including one on the present European war. He received a degree of LL.B. from Columbia University in 1878 and in 1909 Amherst College, his alma mater, conferred on him a degree of LL.D. Mr. Whitridge was a director of many corporations besides the Third Avenue and its subsidiary companies. His funeral was attended by some 300 employees of the Third Avenue Railway, and a number of men very prominent in public life were among those who acted as honorary pallbearers. A resolution of sympathy and regret at Mr. Whitridge's death was drawn up at a meeting of the board of directors of the Third Avenue Railway held on Jan. 3.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Berwyn, Ill.—The Chicago & West Towns Railway has received a franchise from the City Council of Berwyn to construct three new crosstown car lines on Harlem, Ogden and Ridgeland Avenues.

Taylor Springs, Ill.—The Southern Illinois Light & Power Company has received a franchise from the City Council of Taylor Springs to construct a line to the American Zinc Company's smelter.

Columbus, Ohio.—The City Council of Columbus granted a new twenty-five-year franchise to the Columbus Depot Company on Dec. 26 to cross a number of streets and erect a depot and union terminal station. The company will have until 1919 to complete the work. Town, Front, Rich, Walnut and Wall Streets are to be crossed with tracks and switches.

Miami, Okla.—The Oklahoma & Northern Traction Company has received a franchise from the City Council of Miami to construct a line on Vine Street for passenger traffic and a line on Short Street for freight traffic. F. M. Overlees and Richard Flood, Bartlesville, are interested. [Dec. 23, '16.]

***Union, S. C.**—Application has been made to the City Council for a franchise to construct an electric railway in Union. E. F. Kelly, B. F. Kennedy and A. C. Kennedy, Union, are interested.

Salt Lake City, Utah.—The Emigration Canyon Railroad has asked the Council for a franchise to construct an extension to the mouth of Big Cottonwood Canyon and thence up the canyon.

***Hampton, Va.**—H. R. Booker, Nelson D. Groome and H. H. Holt have received a franchise from the City Council to construct a line from Mallory Avenue to the city limits of Hampton.

TRACK AND ROADWAY

Montgomery Light & Traction Company, Montgomery, Ala.—A report from the Montgomery Light & Traction Company states that it will construct an extension from Pickett Springs to Wetumpka, 9 miles, during 1917.

Fort Smith Light & Traction Company, Fort Smith, Ark.—During 1917 this company will construct 1 mile of new track.

Peninsular Railway, San Jose, Cal.—Work will be begun in February by the Peninsular Railway lowering the tracks on its Alameda branch. It is estimated that the cost will be about $100,000.

Connecticut Company, New Haven, Conn.—Work has been begun by this company laying tracks on the new Stratford Avenue bridge, at Bridgeport. A temporary track is being laid on the northerly side of the bridge, which will be replaced with permanent rails later when the bridge is in use. On the southerly side the company will lay permanent tracks, and while these are being laid the cars will use the temporary tracks.

Valdosta (Ga.) Street Railway.—A report from the Valdosta Street Railway states that the company expects to begin construction of 3 miles of track in February or March.

Caldwell (Idaho) Traction Company, Ltd.—This company reports that during 1917 it expects to electrify the line between Caldwell, Greenleaf and Wilder, 10.3 miles, leased from the Oregon Short Line and now operated with steam.

Pekin City Municipal Railway, Pekin, Ill.—A report from the Pekin City Municipal Railway states that it will construct 2 miles of new track during 1917.

Springfield (Ill.) Consolidated Railway.—A proposition for placing all overhead wires in underground conduits, to be owned by the city and to be leased to the public utility companies, has been submitted to the City Council by A. D. Mackie, general manager of the Springfield Consolidated Railway. The cost of the installation of conduit system is estimated at $390,000.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company will construct an extension during the coming spring to the plant of the Premier Motor Corporation near Brookside Park. The exact route has not been announced but will be submitted to the Board of Public Works in the near future.

Mason City & Clear Lake Railroad, Mason City, Iowa.—This company reports that it will construct 7 miles of new track during 1917.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has applied to the Public Utilities Commission of Kansas for authority to issue $2,000,000 additional in bonds and $900,000 additional in capital stock for the purpose of making extensions into other counties, including Sumner, Butler, Cowley, McPherson, Marion, Rice, Saline and Dickinson.

Brantford (Man.) Municipal Railway.—A report from the Brantford Municipal Railway states that an extension of about 2 miles may be built during 1917.

United Railways & Electric Company, Baltimore, Md.—The Public Service Commission of Maryland has passed an order authorizing the United Railways & Electric Company to construct a new car line out Liberty Heights Avenue to Berwyn Avenue, and has approved the company's plans for the new route. The new line will make connection with the Garrison Avenue line and another line to enable passengers to reach Howard Park and Gwynn Oak.

Boston (Mass.) Elevated Railway.—This company will construct new rails in Salem Street from the Faulkner school to Broadway.

Lawrence, Mass.—A contract has been awarded by the Lawrence Bridge Commission to Joseph Wagenbach & Son, Lawrence, at $19,987, for the construction of 1500 lineal feet of double track on the Central Bridge across the Merrimac River in Lawrence. [Dec. 16, '16.]

Milford, Attleboro & Woonsocket Street Railway, Milford, Mass.—A contract has been awarded by the Milford, Attleboro & Woonsocket Street Railway to F. T. Ley & Company, Springfield, for the construction of a new bridge at Franklin at a cost of about $5,000.

Berkshire Street Railway, Pittsfield, Mass.—The Public Service Commission of Massachusetts issued an order Dec. 30, 1916, requiring the Berkshire Street Railway to complete its Lee-Huntington line for service on or before July 1, 1917.

Springfield (Mass.) Street Railway.—The lines of the Springfield Street Railway west of the Connecticut River are being equipped with the sectional three-wire system in an attempt to mitigate electrolysis.

Worcester (Mass.) Street Railway.—This company has received permission from the Board of Aldermen to construct an extension in Greenwood Street, Worcester, to the Millbury line.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—It is reported that the Omaha, Lincoln & Beatrice Railway will let contract early in the spring of 1917 for the construction of an extension from Lincoln to Omaha, via Havelock, Greenwood, Ashland, Papillion and South Omaha, about 50 miles, including the construction of pile and steel concrete bridges.

Fallon (Nev.) Electric Railroad.—This company, which is building a line from Fallon to Sand Springs, 38 miles, states that during 1917 it expects to build a line from Fallon to Stillwater, 4 miles. [Nov. 25, '16.]

Brooklyn (N. Y.) Rapid Transit Company.—Work will be begun during March by the Brooklyn Rapid Transit Company on the construction of an extension of the Metropolitan Avenue line. The line will extend from St. John's Cemetery, in Middle Village, through the Forest Hills section and thence to Jamaica Avenue, Richmond Hill.

International Railway, Buffalo, N. Y.—This company has completed its new double-track line on Bailey Avenue, between East Ferry and Genesee Streets and Broadway and William Street. One track has been laid between William and Clinton Streets and cars are now being operated over this new route, a distance of more than two miles. Tracks have been laid between Clinton and Seneca Streets and service over the line between Broadway and Seneca Street will be started within the next few weeks.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company plans to lay a double track along College Avenue, from Roe Avenue north to West Thurston Street, at which point a new single-track line is to be laid along Thurston Street to Westside Avenue, where it will be united with the present tracks.

New York State Railways, Utica, N. Y.—The president, trustees and citizens of Whitesboro have filed a petition with the Public Service Commission of New York asking that the New York State Railway be required to reconstruct its tracks through the village, the present track construction being too light and inadequate.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Public Utilities Commission has authorized the Northern Ohio Traction & Light Company to issue $1,000,000 additional stock, from the proceeds of which a number of improvements will be made.

Cleveland (Ohio) Railway.—This company plans to construct tracks on the new Detroit-Superior high-level bridge at a cost of about $135,000.

Columbus Railway, Power & Light Company, Columbus, Ohio.—This company has proposed to build a line on Eleventh Avenue from Fourth Street into and past the State Fair Grounds to connect with its Linden line, if the city will accept $5,000 as its proportion of the cost of eliminating the Big Four Railroad grade crossing. The Council asked the company to pay $20,000. The Chamber of Commerce recently passed a resolution requesting the Council to accept the company's offer.

***Middlefield & Lockwood Traction Company, Middlefield, Ohio.**—The Public Utilities Commission of Ohio has authorized this company to issue $100,000 of common stock and $200,000 of bonds for the purpose of constructing a line between Middlefield and Lockwood, 12 miles, which will be operated by the Eastern Ohio Traction Company. This will connect Cleveland and the Youngstown district.

Sand Springs Railway, Tulsa, Okla.—It is reported that the Sand Springs Railway has awarded a contract for the double-tracking of its line from Sand Springs to Tulsa.

Tulsa (Okla.) Street Railway.—This company was stopped by an injunction issued by the District Court at Tulsa when it attempted to lay its tracks across the new $200,000 bridge built by Tulsa County, across the Arkansas River at Tulsa. The traction company had laid 500 ft. of track on the approaches to the bridge when the injunction was granted. Tulsa County Commissioners have laid down certain rules and conditions that must be met by any traction company which desires to use the new bridge. The public authorities contended that the company was not meeting these requirements.

Tulsa (Okla.) Traction Company.—It is reported that construction has been begun by this company on its proposed extension to Sapulpa. All material for the new line has been purchased and contracts that have been let call for a completed road that will permit the operation of trains from Tulsa to Red Fork.

Montoursville (Pa.) Passenger Railway.—This company reports that in the spring it will construct 1½ miles of new track in Loyalsock Township and in Montoursville.

Philadelphia, Pa.—According to an unofficial announcement, the public hearing before the Public Service Commission of Pennsylvania on the application of Director Twining for a certificate of convenience for the Byberry trolley line will be held in Philadelphia during the week of Jan. 8. The Byberry line, for which $1,200,000 has been appropriated, is designed to extend from Frankford and Oxford Avenues, along Oxford Avenue, Castor Road, Bustleton Avenue, Worthington Road and Southampton Road to Byberry and Beusalem Pike, in the Thirty-fifth Ward.

Dallas (Tex.) Consolidated Street Railway.—This company has announced its readiness to begin improvements on Tremont Street from Beacon Street to Fulton Street, as ordered by the City Commissioners of Dallas. The company will relay its tracks with 90-lb. T-rails, the work to be completed early in February.

Grays Harbor Railway & Light Company, Aberdeen, Wash.—Petitions asking the construction of a line between Grays Harbor and Willapa Harbor will be presented to the officials of Grays Harbor Railway & Light Company at an early date by the Grays Harbor Realty Association.

***Tacoma, Wash.**—President D. D. MacKay of Whitworth College, Tacoma, backed by business men of Spokane, is heading a committee which will petition Louis W. Hill, president of the Great Northern Railway, to construct a street railway line from Whitworth College to Spokane, to supplant the present jitney service. President MacKay states the college has an offer from one railroad company that if the college will obtain the roadbed and lay the rails, the company will take care of the operation of the line. The estimated cost of constructing the line has been placed at $20,000.

Wisconsin Railway, Light & Power Company, La Crosse, Wis.—This company reports that during 1917 it expects to double-track and reconstruct some of its lines.

SHOPS AND BUILDINGS

Pacific Electric Company, Los Angeles, Cal.—Work has been begun on the construction of new carshops for the Pacific Electric Railway at Torrance. Fourteen buildings will be constructed at this time, these constituting the first and principal unit of a group that will eventually include thirty or more structures. As soon as the need for expansion arises, a second unit comprising six structures will be erected adjoining the first group. The new buildings, equipped, will cost over $500,000, and all plans are made so that the plant can be doubled at any time without any impairment of efficiency while the construction work is going on. Recreation grounds, including a baseball field and tennis courts, will be provided for the employees, and the entire surroundings made as agreeable as possible.

Connecticut Company, New Haven, Conn.—This company will reconstruct and extend its carhouse at Waterbury, for which an authorization of $200,000 has been granted.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has received bids for the construction of station finish for nine stations on the lower portion of the Seventh Avenue subway in Manhattan. The contract has already been awarded by the Commission covering several stations on the northern portion of this line. The stations included in the bids recently received were those between South Ferry and Fourteenth Street inclusive, including two express stations. The low bidder was the Seventh Avenue Construction Company, New York, at $389,880. Bids had been received for the construction of station finish for the above stations previously. The bids were rejected, however, when question arose as to the incorporation of one of the bidders.

Piedmont & Northern Railway, Charlotte, N. C.—It is reported that plans have been prepared by the Piedmont & Northern Railway for the construction of twelve warehouses to cost about $100,000.

POWER HOUSES AND SUBSTATIONS

Indiana Railways & Light Company, Kokomo, Ind.—This company has announced that it will enlarge its power house at Kokomo, and plans to install four new boilers of 500-hp. capacity at an estimated cost of $48,000; a 5000-kw. turbine and necessary auxiliaries at an estimated cost of $90,000 and additional pumps, heaters and other devices necessary to complete the enlargement of the plant at a cost of $10,000. The installation of 250 new street lamps at an estimated cost of $10,000 to $12,000 is also planned.

Burlington Railway & Light Company, Burlington, Iowa.—This company has received permission from the Iowa Railroad Commission to extend its transmission lines in Louisa and Des Moines Counties.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Business Announcements Trade Literature

Steel Tie and Crossing Foundation Business Is Active

Inquiries Very Numerous from All Parts of Country —Price Increase Probable—High Prices of Manganese Crossings Stimulate Crossing Foundation Inquiries

Inquiries for steel ties and for crossing foundations were never before so numerous," according to E. M. Haas, sales manager of the International Steel Tie Company. "These inquiries," he states, "originate with both electric and steam railways. They are not confined to any part of the country nor to large or small roads but are diversified as to location and size of property. One reason for the inquiries is the anticipation of an increased price in the spring and because a great many roads were sufficiently fore-handed to order rails far in advance for the 1917 construction season."

STEEL TIES SOLD AT LESS THAN MATERIAL PRICE

According to Mr. Haas the possible increase in the price of the International twin-steel track ties is due entirely to the raw material market situation. The International company now has more than $100,000 worth of raw material in its yards, but a large part of this will be required in fulfilling tie contracts now in hand. This reserve supply of steel was purchased some time ago at 2½ cents per pound. The market is now at 4½ cents per pound, and deliveries are difficult. According to the manufacturer, twin-steel ties are now being quoted at a price below that of the present cost of the raw material, and therefore it appears that when additional material is necessary, the manufacturer will be forced to increase the selling price of the ties. "At present prices," Mr. Haas says, "the use of steel twin-ties, compared with wooden ties, will show a construction-cost saving ranging from $2,000 to $6,000 per mile. This proportionately large saving is derived from savings in excavation and in concrete, as well as in the cost of ties. Thus, any slight increase in the first cost of the steel tie will not greatly affect the initial and final economy.

CROSSING FOUNDATION BUSINESS DEVELOPING FAST

"The unusually high range of prices for special track work and particularly crossings in which manganese steel is used has brought about more active recognition of the value of stable crossing foundations. This condition has accelerated the sale of the International crossing structures. The roads have found, for example, that by combining an ordinary built-up crossing with the International steel crossing foundation, the life and cost of the unit, installed in situations where the life of the crossing is limited by the bolt breakage, compares favorably with that of the installation of a manganese steel crossing. The reason for the economy is the large bearing area of the International foundation. This, in combination with a built-up crossing, affords a bearing area much larger than that of a widely spread manganese steel crossing. Moreover, bolt breakages are practically eliminated by the unit support given to the composite crossing frogs."

Favorable service reports on six International crossing foundations installed by the Los Angeles Railway, where it crosses the Santa Fé Railroad tracks, have resulted in orders for the construction of other foundations which will be used by the Santa Fé for steam-over-steam crossings. It is pointed out by Mr. Haas that in this way the Santa Fé System will be able to watch the crossing foundation performance and have entire say about its maintenance. They will thus be able to determine the actual cost. The Pennsylvania Railroad also has installed six of these foundations in Indiana and Ohio. Some of these have been down three years, and the results are so favorable that the engineering department of the road is said to have appointed a committee of division engineers to keep track of the performance of these crossings and to report for the benefit of the entire Pennsylvania System.

Adaptation of Compressed Air to Door and Step Control

T. W. Casey Discusses in Detail the Advances Made in the Various Branches of This Highly Specialized Art

In a recent interview, T. W. Casey, vice-president of the National Pneumatic Company, discussed the remarkable development during recent years of pneumatic door and step control for electric railway cars.

When the company brought out its first pneumatic engines for operating car doors, in 1905, it was already doing a large business in air operators for elevator doors. The air-operated car door was considered applicable only to heavy rapid-transit service like the New York subway, where it was obviously impracticable to operate center doors rapidly by hand when the guard was stationed on the end platform. These engines lacked a number of the features that are in use to-day, such as the cushioning feature, the releasing feature which prevents passengers from being caught in the doors, means by which doors may be opened at one rate of speed and closed at another; means by which only a practically negligible amount of air is used —as well as numerous detail improvements, such as continuous lubrication regardless of weather conditions, etc.

The use of air-operated doors in heavy rapid-transit service showed such a clear gain in reducing the standing time of the cars at station stops that progressive operators began to see its advantages for operation on surface cars. This was particularly true of applications to lines with congested traffic and short headways, where the burdens imposed upon the motorman and conductor are so great that any automatic device that enables them to handle passengers faster and more safely is worth consideration.

It would seem a very simple problem to work out air-operated doors, and steps interconnected therewith, for practically universal application. Nevertheless, almost every city has a combination of needs that calls for important variations whose successful invention and application demands the services of men who are specialists in pneumatic devices. As examples of diverse conditions one may name the Bay State Street Railway, where both left-hand and right-hand operation are required; the New York Municipal Railway, where it is necessary to operate from one to six doors; the Pontiac Interurban Division of the Detroit United Railway, where the doors must be capable of being operated from any part of the car; and the Detroit city lines, where the air consumption of the engines must be so low that it will not interfere with the storage-air-brake operation unique to Detroit.

The National Pneumatic Company's engineers have been obliged to develop not only the design but in many cases the tools for securing that exactitude of manufacture that is essential to a pneumatic device called upon to operate hundreds of times a day under very severe conditions.

It is now recognized that air-operated doors and steps not only fulfill the function of greater safety but they make possible higher schedule speeds, permit the conductors to collect fares under easier conditions, allow the mechanism to be operated with scientific uniformity and ease, and, in general, enable the car to produce more revenue car-miles a day than had been hitherto possible.

Among the cities where this company's air-operated door and step control is used may be named New York, Brooklyn, Boston, Cleveland, Detroit, Schenectady, Utica, Syracuse, Ottumwa, Indianapolis, Haverhill, Toledo, Denver and Pasadena. These installations cover practically the whole range of electric railway service. Judging from the large number of equipments ordered during 1916, Mr. Casey feels that the time is not far distant when practically all new cars and a very large proportion of existing cars will be fitted with pneumatic door and step control.

Copper Value Contends with Iron for First Place

A total of over $100,000,000 in dividends was paid out of the mines of five Western States in the year 1916, according to a recent report of the Geological Survey to Secretary Lane, just made. "Never before," said Mr. Lane, "has so large a draft been made on the natural resources of our country as during this year, and never before have the metals been extracted from these ores with less waste or utilized to better advantage in advancing the general prosperity of the country. Even as written in the plain figures of 1916 production, the wonderful record of our mines sets forth a degree of national industrial independence only hoped for a few years ago.

"Again copper stands out as the best illustration of how American mines can meet a world demand. The output of nearly 2,000,000,000 lb. of the red metal is double that of ten years ago, and its value is twice that of the copper produced in 1915. Add to this the facts that in value copper now contends with iron for first place among the metals, and that together the amount of these two metals produced last year had a value of more than $1,000,000,000, and we have a measure of what this country can contribute in useful metals.

"The output of zinc for domestic ores increased last year 95,000 tons, which makes a new record for that metal, the total value of spelter from United States ore being $150,000,000. Lead also shows a large increase, the $75,000,000 output being a gain of more than 50 per cent.

"Another mineral product which furnishes an index of business conditions is cement, the 1916 production of which is estimated to be 5,000,000 bbl. in excess of the output of the previous year, while the shipments were even greater, aggregating 94,500,000 bbl.

"These advance statements not only show that 1916 marks a new advance for the mineral industry of the country, but this remarkable increase promises to be approximately 25 per cent over the 1915 production."

Rubber Covered Wire Market a Puzzle

Market Hard to Analyze—Manufacturers Crowded with Orders—No Fixed Price for Bare Wire —No Hope for Lower Prices

The market situation for rubber covered wires and cables is most difficult to analyze so far as the future is concerned, and according to manufacturers it would be unwise to hazard a guess as to how long the present condition will continue. The operation of the law of supply and demand under the present situation is influenced by many uncertain factors, and also it is generally admitted that the output of copper for the first half of 1917 is practically all under contract. Even if orders for war munitions were curtailed, that could not affect the wire and cable industry for months to come. Manufacturers' books are crowded with orders for deliveries which will run well into 1917, and these orders were taken and the copper contracted for at prevailing prices.

There is no fixed price for bare copper wire. It is altogether a matter of bargaining between buyer and seller, and the price is largely determined by the necessities of the buyer. Bare copper wire in substantial quantities for immediate delivery, or even for delivery in the near future, is not to be had. That manufacturers are paying premiums to expedite deliveries and are placing orders for shipments five and six months hence is also true, as well as that purchasers who have in the past followed the policy of holding up requisitions in the hope of lower prices now find themselves obliged to cover their needs in a much higher market. "The Wire Message," published by Habirshaw Electric Cable Company, Inc., and the Electric Cable Company, commenting on the foregoing situation, says that it "can see nothing in the copper situation to justify the hope of lower prices in the near future. On the contrary there are many indications that point to higher values."

Electrical Production for 1916 Passes Half-Billion Mark

At no time in the history of the world has industry been carried on so tremendously as during the twelve months of the year that has just passed. The new year is ushered in to the music of a record of production difficult not only to surpass but even to equal. In this flood of business prosperity the electrical industry was swept along with the leaders. Electrical manufacturers and agents have produced and sold to the last ounce that was physically possible, and yet the market is unsatisfied. The production of electrical goods in 1916 went beyond the $500,000,000 mark, while the unfilled orders at the beginning of 1917 were probably well over $200,000,000. There was placed, therefore, in 1916 a volume of orders for electrical equipment of $750,000,000, a most stupendous total for an industry that has practically grown up within the present generation.

With one or two exceptions the orders placed in 1916 were not particularly large. In the first few days of 1916 a $1,000,000 order was placed for the electrical equipment of a steel mill, and in the last few weeks of the year a prominent holding company placed a $1,000,000 contract for electrical equipment for its various plants. As a rule, however, the orders were not of a size to create comment.

On the other hand, there was a marked tendency toward the purchase of units larger than ordinary rating. Orders were received for a number of 15,000-hp., 12,000-hp. and 8000-hp. motors. The 15,000-hp. size is the largest ever built. Turbo generator sets passed the 60,000 hp. mark early in the year, when a 73,000-hp. set was ordered for one of the largest urban railways in the country. There have been other orders for sets in the neighborhood of 50,000 hp., which rating was unattained until a few months previous to the placing of the order for the 73,000 hp. set.

ROLLING STOCK

Toronto (Ontario) Railway, Toronto, Canada, is reported on Dec. 28 to have lost 130 cars in a fire which totally destroyed its carhouse.

International Railway, Buffalo, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1916, as having ordered twenty double-end center-entrance cars from the G. C. Kuhlman Car Company has specified the following details for this equipment:

Seating capacity	63
Weight (car body only)	27,000 lb.
Bolster centers, length	32 ft. 0 in.
Length of body	43 ft. 10 in.
Over vestibules	53 ft. 7¼ in.
Width over sills—	
Over all	8 ft. 8¼ in.
Height, rail to sills	2 ft. 10⅞ in.
Sill to trolley base	9 ft. 3 in.
Body, wood or metal	Semi-steel
Interior trim	Mahogany
Headlining	Nevasplit
Roof, type	Arched
Underframe	Metal
Air brakes	Westinghouse AMM.
Axles	5 in. and 6 in. EB.
Bumpers	Hedley Anti-climbers
Cables	Flexible
Car trimmings	Chocolate brass
Conduits and junction boxes	Crouse-Hinds
Control, type	GE, PC.
Couplers	Tomlinson
Curtain fixtures	Curtain Supply-Rex
Window fixtures	Ring 1 in. roller
Curtain material	Pantasote
Door operating mechanism	Consolidated
Destination signs	Hunter
Fenders or wheelguards	Locomotive Patented
Gears and pinions	GE Grade M
Gongs	12 in. Dedenda
Hand brakes	National
Heaters	Consolidated
Headlights	GE Luminous
Journal boxes	4¼ in. x 8 in. MCB
Motors, types and number	4 GE 203
Motors, suspension	Inside
Paint	Acme System
Registers	New Haven Square
Sanders	Westinghouse
Sash fixtures	Brill
Seats, style	Transversible head roll
Seating material	Fabrikoid
Springs	Brill
Step treads	Feralun Safety
Trolley catchers or retrievers	Earll No. 10
Trolley base	US 14
Trucks, type	Brill MCB-2
Varnish	Valspar
Ventilators	Brill Exhaust
Wheels	30 in. rolled steel, 3 in. tread ¾ in. flanges

Toronto (Ont.) Railway, Toronto, Canada, lost 130 cars in a disastrous fire which totally destroyed the King Street carhouse on the Don River and caused a loss of about $500,000. Of the equipment destroyed, one-third consisted of palace cars, the remainder being cars of other types. The King Street division will be operated temporarily from the Front Street carhouse and cars from the different divisions will be drawn to provide an adequate service. It is reported that the loss will be fully covered by insurance.

East St. Louis & Suburban Railway, East St. Louis, Ill., and not the Columbus (Ohio) Railway, Power & Light Company, as was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 23, is said to be in the market for five city cars and three interurban cars. It was stated that this company was planning to rebuild forty-five cars in its own shops, but these plans have been changed. The company now plans to have new car bodies built by the American Car Company, making use of the hardware and equipment from the old cars as far as possible.

TRADE NOTES

Trolley Supply Company, Canton, Ohio, has received an order from the Boston Elevated Railway for 200 Simplex trolley bases for its 100 new cars.

Joseph A. Bower, Philadelphia, Pa., president of the Hale & Kilburn Company, has been elected a vice-president of the Liberty National Bank, New York City.

Robbins & Myers Company, Springfield, Ohio, announces that on Jan. 1, 1917, the Rochester office will be removed to 740 Ellicott Square Building, Buffalo, N. Y. L. Larsen, the present manager of the Rochester office, will have charge of the Buffalo office.

Stanley M. Tracy, until recently Western district manager in the Chicago office of the Driver Harris Wire Company, is now assistant general sales manager at the main office and works of the company, Harrison, N. J.

F. H. Poss became sales manager of the Benjamin Electric Manufacturing Company on Jan. 1. He was formerly Pacific Coast manager for the same company, having opened that office in 1905. Between 1905 and 1912 he also represented the Holophane Company.

American Conduit Manufacturing Company, Pittsburgh, Pa., announces that beginning Jan. 1, M. B. Austin & Co. of 700 Jackson Boulevard, Chicago, Ill., will be its sales agents in Chicago territory for the following products of its manufacture: "Wiremold," the new surface wiring material, and "Wireduct," a non-metallic flexible conduit.

Hensley Trolley & Manufacturing Company, Detroit, Mich., will be represented after Jan. 1 in the New England States by the Frank Ridlon Company, 261 Franklin Street, Boston, Mass. The company feels that its many customers in the New England States will be better taken care of by having a representative in this territory and for this reason they have appointed the above company as exclusive agents.

F. R. Blair & Company, Inc., 50 Church Street, New York, N. Y., announce that on Jan. 1, 1917, H. H. Gildner, who has been chief engineer for the S. K. F. Ball Bearing Company for the last three years, has joined this organization as manager of the Flexite department. Mr. Gildner will make his headquarters in New York and will devote his time to the development and sale of Flexite universal joints and couplings.

Lord Manufacturing Company, New York, N. Y., wishes to correct the announcement made in the ELECTRIC RAILWAY JOURNAL of Dec. 30, and advises that the entire business, together with all of the railway devices now manufactured by it, will be taken over and handled after Jan. 1, 1917, by the Horne Manufacturing Company, 50 Court Street, Brooklyn, N. Y. Under the new arrangement manufacturing facilities will be increased and the scope of the selling organization enlarged.

Lumber Prices Show Little Increase.—A recent compilation by the best authorities of the prices of 111 commodities on the New York market compared with only two years ago shows a minimum increase of 19 per cent, a maximum of 476 per cent and an average of 85 per cent, yet the official Government figures show that the lumber manufacturer in 1915 got 10 per cent less per thousand feet for his product than in 1906. According to R. S. Kellogg, secretary National Lumber Manufacturers Association, the 1916 lumber prices will average little more than those of 1915.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y., has issued bulletin No. 49,300 on single, flat twin and three conductor band-steel armored cables. A number of completed installations are shown and several pages are devoted to data on the different types and grades of armored cable.

Peter Smith Heater Company, Detroit, Mich., has sent out a danger notice in the form of a post card. This card is a warning to operators of hot-water heaters, advising them to test safety valves and to know that the system is open and free to circulate before placing heaters in service.

United Hammer Company, Boston, Mass., is distributing a sixteen-page booklet on Fairbanks' hammers. The regular hammers which are manufactured in sizes of from 25 lb. to 300 lb. are described and illustrated, as are also motor-driven hammers with special treadle and hammers with self-contained countershafts.

Atlas Preservative Company of America, Inc., 95 Liberty Street, New York, N. Y., announces that the company has been reorganized and after Jan. 1, 1917, will be known as the Chipman Chemical Engineering Company, Inc. The company as reorganized will continue the weed-killing business by the Atlas "A" method, and the manufacture and sale of chemicals used in this process will be continued as in the past. Improved manufacturing facilities and additional capital will enable the company to give its customers the highest class service. The staff of the new company, of which R. W. Chipman is manager, will remain the same.

Harvey Fisk & Sons, New York, N. Y., bankers and government bond dealers, have published a 120 page pamphlet, "The Insular Possessions of the United States—The Republic of Cuba," descriptive of the island possessions of the United States, Hawaii, the Philippine Islands and Porto Rico, and of the Republic of Cuba. The book contains chapters on the area and population, products and industries, banks, commerce, finances and bonded debts, also historical notes. The book will be found valuable for reference not only by investors, but also by all persons who wish to be well informed about these island countries.

Railway Utility Company, Chicago, Ill., has issued catalog No. 600 on car ventilation and on the thermometer control of electrically heated cars. The operation of the thermometer control is explained, and wiring diagrams and illustrations of the regulator panel are also given. One section is devoted to Honeycomb and round-jet ventilators which are designed for all classes of cars and buildings. Sections through the different types of Honeycomb ventilators are shown and in addition a summary of tests showing efficiencies are tabulated. The last ten pages show illustrations of these ventilators installed on electric car equipment.

NEW PUBLICATIONS

Applied Electricity for Practical Men. Arthur J. Rowland, McGraw-Hill Book Company. 375 pages, illustrated. Price $2.

The many books written for the purpose of imparting electrical knowledge without demanding of the reader a considerable acquaintance with mathematics generally have one of two faults. They either attempt to cover the whole range of electricity or they deal too much with principles without giving sufficient knowledge of practical applications. This volume seems well adapted for practical men who expect to make direct application of their information to their daily work with commercial circuits and machinery. It does not touch problems of apparatus design. Pure theory is avoided except as it bears directly on practical matters. The principle stated and the explanations of apparatus offered are given to show the practical application of the theory. Numerical problems are given at the end of each chapter, and these are useful both in teaching the principle and performances of apparatus and also as guides in solving particular problems that may come up in practice. The book should prove very useful for teaching applied electricity in trade and industrial schools, and for helping electrical workers of all kinds.



The Duais

"Cost" is often as tricky as the Irish enchantress who demanded for **duais** (reward) only

"Enough wool to fill the hole of my arm."

Thereupon she stood in the door of her hut, bent her arm into a circle at her side and directed the purchaser of her magic to thrust wool **through** her arm until the hut was full!

There's no such trickery or enchantment about PEACOCK BRAKES. The **duais** we ask is exactly as modest as we state it! It's a little wool we ask, not a houseful!

In other words, the first cost of a Peacock Brake is practically the only cost. You don't have to add to it the further cost of excessive maintenance and accident charges.



National Brake Co.

Buffalo, N. Y.

Bankers and Engineers

Electric Railway Lighting and Power Company Bonds
ENTIRE ISSUES PURCHASED
THE NATIONAL CITY CO.
NATIONAL CITY BANK BUILDING
55 WALL STREET, NEW YORK

THE J·G·WHITE COMPANIES
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . . . . NEW YORK
LONDON SAN FRANCISCO CHICAGO

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 SOUTH LA SALLE STREET
CHICAGO
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Arthur D. Little, Inc.
An organization prepared to handle all work which calls for the application of chemistry to electric railway engineering—such as the testing of coal, lubricants, water, wire insulation, trolley wire, cable, timber preservatives, paints, bearing metals, etc.
Correspondence regarding our service is invited.
93 Broad Street, Boston, Mass.

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ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
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Purchase, Finance, Construct and Operate Electric Light Gas, Street Railway and Water Power Properties.
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Technical Men Want Facts
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POWER STATIONS GAS WORKS
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THE P. EDW. WISCH SERVICE
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Park Row Bldg., New York Board of Trade Bldg., Boston

ROOSEVELT & THOMPSON
71 Broadway ENGINEERS New York
Report, Investigate, Appraise, Manage Electric Railway, Light and Power Properties.

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

AMERICAN BRIDGE COMPANY
HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS



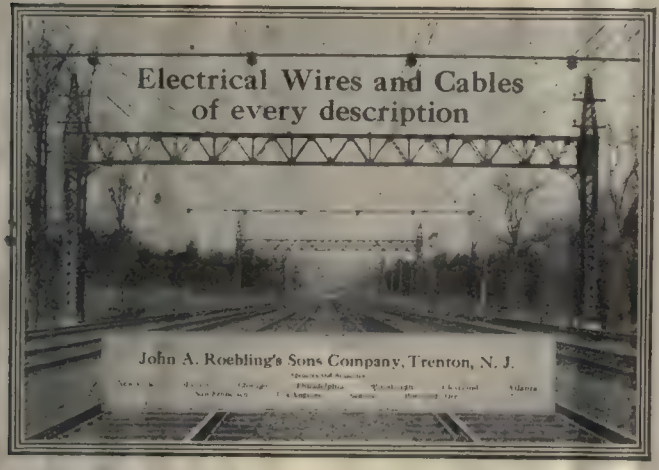
Track Spans, Panama

SALES OFFICES

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Philadelphia, Pa., . Widener Building
Boston, Mass. . . John Hancock Bldg.
Baltimore, Md., Continental Trust Bldg.
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Rochester, N. Y. . . . Powers Block
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Cincinnati, Ohio. Union Trust Building
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Denver, Colo., First Nat'l Bank Building
Salt Lake City, Utah, Walker Bank Bldg.
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Pacific Coast Representative:
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SAN FRANCISCO, CAL., Rialto Building
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Seattle, Wash., 4th Ave. So. Cor. Conn. St.

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United States Steel Products Co., 30 Church St., N. Y.



The famous men of the electric railway field contribute the benefit of their experience to the

ELECTRIC RAILWAY JOURNAL

The Coal & Iron National Bank of the City of New York

Capital, Surplus & Profits $1,635,000
Resources Nearly $10,000,000.

Offers to dealers every facility of a New York Clearing House Bank.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

EDWARD P. BURCH, Engineer
ELECTRIC RAILWAY VALUATIONS
Dime Bank Bldg., Detroit Plymouth Bldg., Minneapolis

Frederick Sargent
Wm. S. Monroe
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James Lyman
SARGENT & LUNDY, Engineers
1412 Edison Bldg., 72 W. Adams St., Chicago, Ill.

NEILER, RICH & CO., INC. Engineers
Manhattan Building, CHICAGO, ILL.
Reports, Appraisals and Valuations, Railway and Lighting Properties



One of several hundred cars of the Bay State Street Railway equipped with Duff Emergency Jacks

BARRETT
Emergency Type Car Jacks
Reduce Delays from Vehicle Breakdowns

Barrett Emergency Type Car Jacks are more than Safety Insurance.

Their users have found them a first-rate tool for clearing the track of broken-down vehicles.

With one of these jacks on each of your cars, you don't have to wait for a wrecking car to clear the track.

In many cases, you won't need a wrecking outfit at all.

Reduction of Blockade Delays Means Less Loss of Revenue Mileage

For every car-mile that you lose, you may sacrifice 30 to 40 cents revenue.

The unnecessary losses of one blockade will pay for a goodly number of Jacks.

Ask us for prices on these Revenue Conservers.

We maintain an Engineering Dept. for the design of special Jacks to meet individual conditions.



No. 239
"Bay State"
Emergency
Jack

THE DUFF MFG. COMPANY
Pittsburgh, Pa.

New York: 50 Church Street **Chicago: People's Gas Building**
Atlanta: Candler Building



"This is the BIGGEST Little Book I Ever Saw!"



"It's given me some mighty practical tips on economy. For instance, here on pages 6 and 7, I find a handy formula for figuring the comparative costs of copper and aluminum.

"I wish you'd figure it up, and see how much we can save by using aluminum conductors on that new Southwood extension. If it's a real saving—and I feel sure it will be—we'll plan to use aluminum wherever we can, all over the system.

"Be sure to give me back this book, for it's too valuable to lose. I want our Overhead Engineer to have a copy, too—he'll find it very useful. Ask Miss Freeman to write for it right away, please. Tell her to address the

ALUMINUM COMPANY OF AMERICA
PITTSBURGH, PA.
New York Boston Chicago San Francisco

CUT THE COUPON

Aluminum Company of America,
Pittsburgh, Pa.

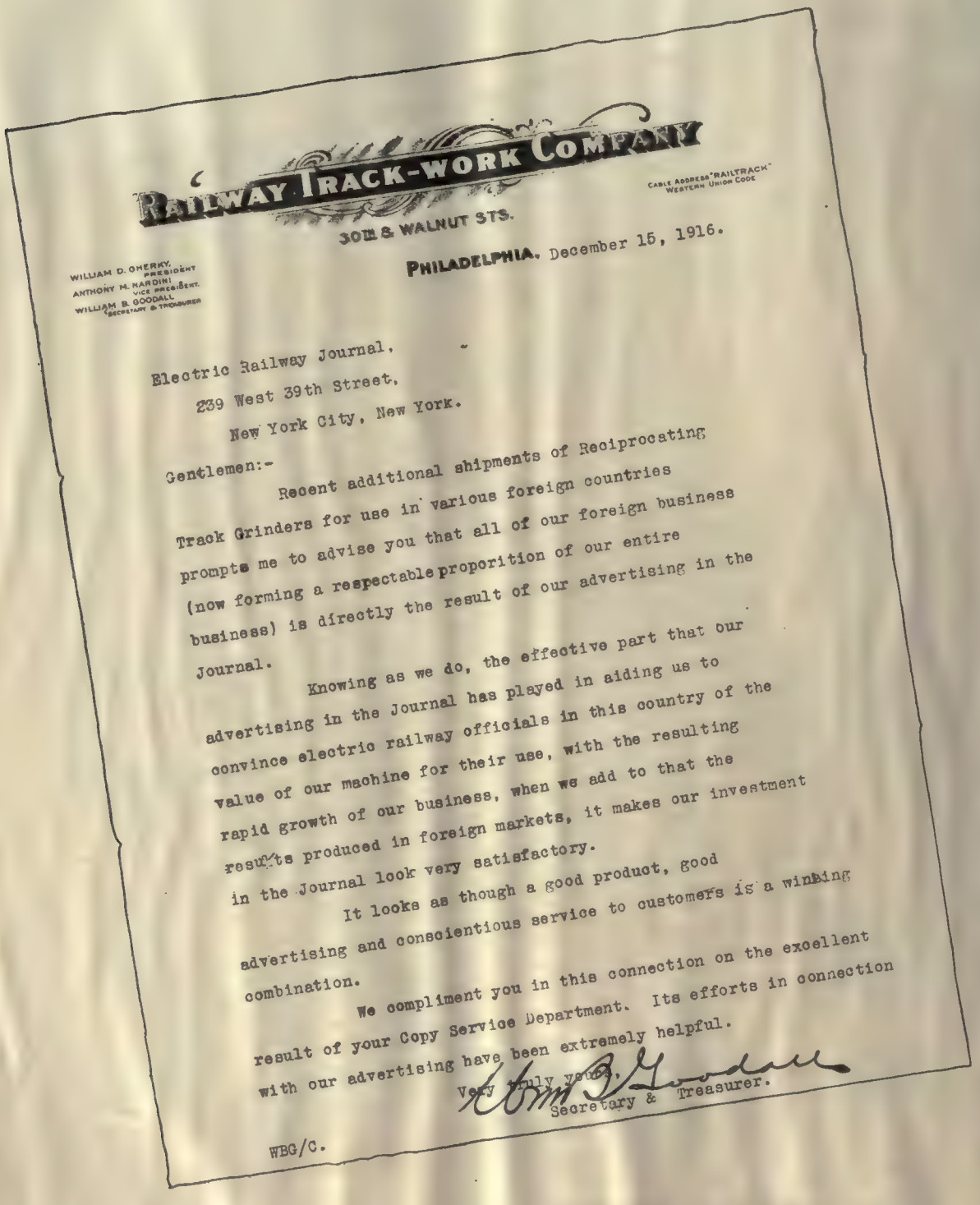
Gentlemen: Kindly mail me your new book on "Aluminum Electrical Conductors."

Name.....
(Full name and title.)

Address.....
(City and Street.)

Occupation.....

The Great Business "A Good Product— Conscientious



RAILWAY TRACK-WORK COMPANY

CABLE ADDRESS "RAILTRACK" WESTERN UNION CODE

30TH & WALNUT STS.

WILLIAM D. GHERKY, PRESIDENT
ANTHONY M. MARDINI, VICE PRESIDENT
WILLIAM B. GOODALL, SECRETARY & TREASURER

PHILADELPHIA, December 15, 1916.

Electric Railway Journal,
239 West 39th Street,
New York City, New York.

Gentlemen:-

Recent additional shipments of Reciprocating Track Grinders for use in various foreign countries prompts me to advise you that all of our foreign business (now forming a respectable proporition of our entire business) is directly the result of our advertising in the Journal.

Knowing as we do, the effective part that our advertising in the Journal has played in aiding us to convince electric railway officials in this country of the value of our machine for their use, with the resulting rapid growth of our business, when we add to that the results produced in foreign markets, it makes our investment in the Journal look very satisfactory.

It looks as though a good product, good advertising and conscientious service to customers is a winning combination.

We compliment you in this connection on the excellent result of your Copy Service Department. Its efforts in connection with our advertising have been extremely helpful.

Very truly yours,

Wm B. Goodall
Secretary & Treasurer.

WBG/C.

Building Combination Good Advertising— Service to Customers"



Reprinted from
Electric Railway Journal
Issue July 15, 1916



A View of the Cincinnati Skyline Opposite Covington

Ten Years Deltabeston Service

and Still Going Strong in the Hills of Old Kentucky

The South Covington & Cincinnati Street Railway was one of the pioneer users of Deltabeston Wire for railway motor rehabilitation. It began this work as early as 1904.

About ten years later when the equipment department had occasion to make a general examination, it found that

ONLY THE OUTER INSULATION NEEDED RENEWAL

To go back to the efficient, everyday service that is so characteristic of D & W Products. That's why the equipment department said:

Good For Ten Years And Then Some!

DELTABESTON WIRE REG. U.S. PAT. OFF.

D & W FUSE CO.

PROVIDENCE, R. I.

A. Hall Berry, 97 Warren St., New York

D&W REG. U.S. PAT. OFF.

Agents—Pettingell-Andrews Company Western Electric Company Central Electric Company



Resolve to Use the

Thermit Insert Rail Weld

in 1917 and Thereafter

Because by reducing the percentage of breaks to a minimum—

The Thermit Insert Weld avoids the expense of street openings which cost far more than the joints or welds.

The Thermit Insert Weld avoids the bad feeling due to tearing up streets in front of business buildings.

The Thermit Insert Weld avoids the heavy losses due to rerouting car service.

The Thermit Insert Weld gives a continuous rail which assures quiet running and long life to your cars.

The Thermit Insert Weld, by eliminating the hard-riding track, also promotes increased use of your service.

New York, Kansas City, Boston, San Antonio, Dallas, Milwaukee, Pittsburgh, Chicago, Youngstown, Los Angeles are some of the cities where

Thermit Welds Are Making Good

GOLDSCHMIDT THERMIT CO.

120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco

103 Richmond St., W., Toronto, Ont.

7300 So. Chicago Ave., Chicago



"—And Now I've Found It"





"I've been hunting for years for a rail brace that would hold my track rigid to gage, do away with the rail drilling menace and stop waste due to rusted threads," said the Roadmaster, "—and now I've found it."

The Combination Rail Brace and Tie-Plate

does all of this—and more. It saves on ties—costs less than tie rod—facilitates paving—and gives better service.

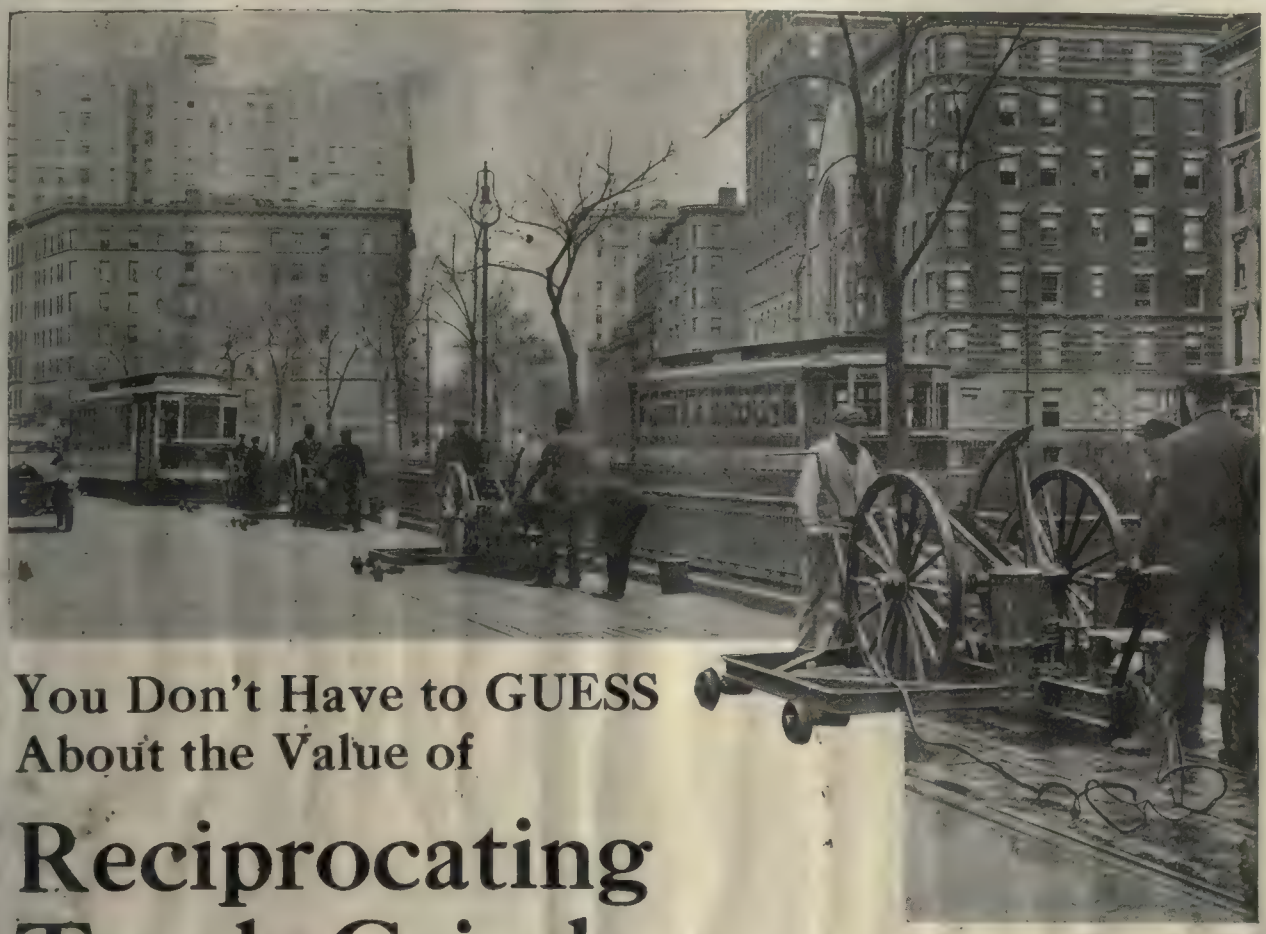
Open hearth steel 3/8" or 7/16" thick for girder or "T" rails.

Start saving now. Write for cost data today.

Steel Car Forge Company

Pittsburgh New York Chicago

Works: Ellwood City, Pa., and Hammond, Ind.



You Don't Have to GUESS About the Value of

Reciprocating Track Grinders

You Can Demonstrate it on your own tracks

And you can do that without a nickel of expense for the machine.

In the past few years more than 60 railway companies have put a Reciprocating Grinder at work on their tracks with the clear understanding that if they were willing to give up the machine after a fair, square trial of it they were simply to say so and we would take it back—all at our expense.

In not a single instance has a machine come back.

This demonstrates two things: First, the supreme efficiency and economy of the Reciprocating Track Grinder.

Second, that it so greatly improves track conditions that no railway having once demonstrated the improvement produced by this machine is willing to be without it.

The elimination of corrugations and cupped joints produces a big saving in maintenance cost, increases life of track, decreases wear and tear on rolling stock, and is a source of satisfaction to the public.

Railway Track-work Co.

30th and Walnut Sts., Philadelphia, U. S. A.

PUBLIC SERVICE ELECTRIC COMPANY

POSTAL TELE

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ADIRONDACK ELECTRIC POWER CORPORATION
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ADIRONDACK ELECTRIC POWER CORPORATION
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ADIRONDACK ELECTRIC POWER CORPORATION
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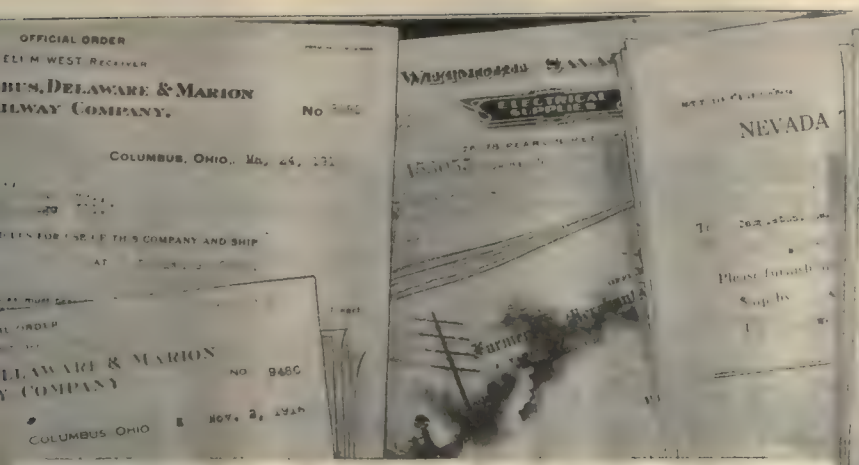


For pulling or straightening poles of all sizes, under any conditions, the No. 318 is a big dividend payer.

The first dozen poles handled will easily defray the whole cost of the Simplex.

Send for Bulletin Catalog No. 216

There's A Simplex Jack



PROOF

OF THE EFFICIENCY AND VALUE

of The No. 318

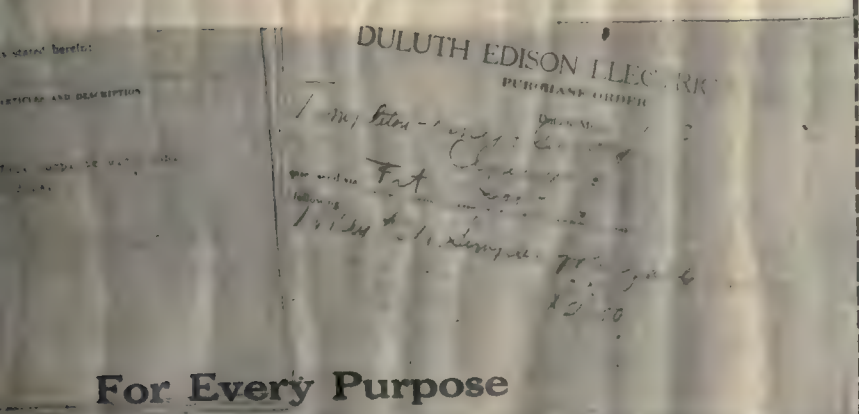
Simplex Pole Jack

Reduces the Labor and Cost of Pulling Poles.

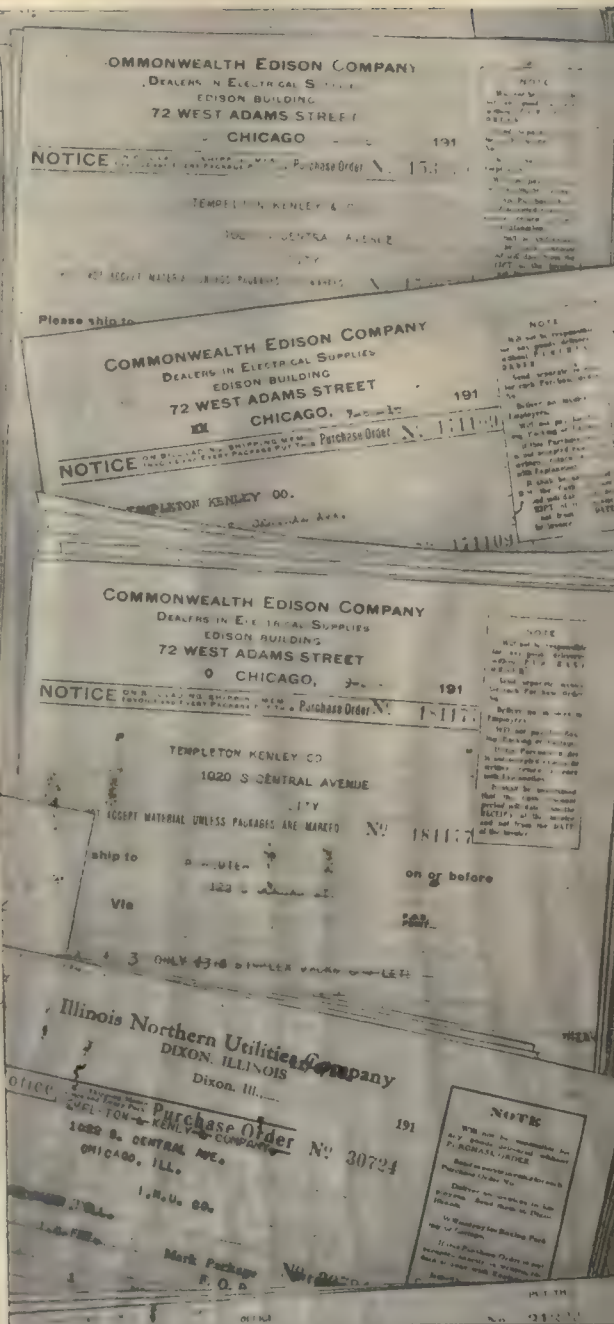
Makes Straightening of Poles a One-Man Job.

Every telephone, lighting and power, public utility and electric railway company will find this tool of extra-ordinary value.

TEMPLETON, KENLY & CO., LTD.
1024 So. Central Ave.
CHICAGO, U. S. A.



For Every Purpose



Send This Order To
Your Nearest Jobber

Gentlemen:

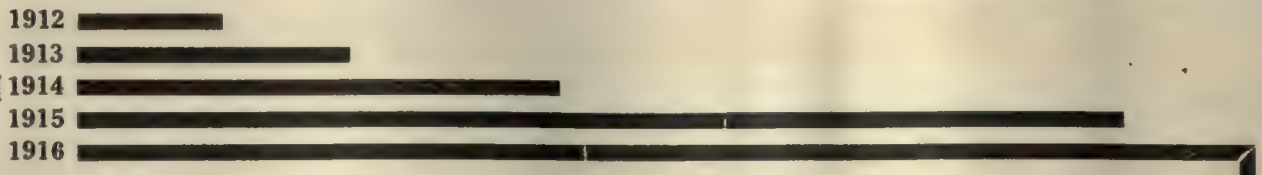
Please furnish

_____318 Simplex Pole Jack including full equipment at $28.00 complete—F. O. B. Chicago.

Name _____

Address _____

Ship Via _____



WATCH US GROW

More Than Twice as Many in 1916 as 1915 —50,000 to Date

During the year 1916 the amount of

"Simplex" and "Apex" Joints

applied by the

Indianapolis Portable Welder

has doubled that of 1915

From a total of only 50 joints installed in the entire country in 1912 the Indianapolis Welder has increased this amount to 50,000 joints up to the present time.

This constant and remarkable growth is sure proof of the superiority of the Indianapolis Portable Electric Welder and "Simplex" and "Apex" joints.

The Price and Delivery of rails, joints and bonds mean more than twice as much as it did last year. This makes it even more important that you consider the use of the Indianapolis Portable Electric Welder.

There's lots more we can tell you about them. Ask us!

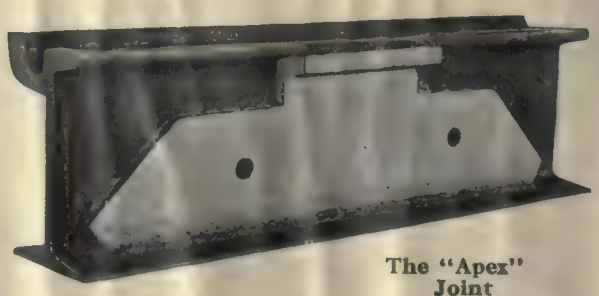
Indianapolis Switch & Frog Co.

New York Springfield, Ohio Chicago





The "Simplex" Joint



The "Apex" Joint

Economical Welding

SIMPLICITY HONESTY

Any weld at all will cost less than replacing a worn rail or a broken part, but no weld is really economical unless it is made at the lowest possible cost.

The Lincoln Arc Welder

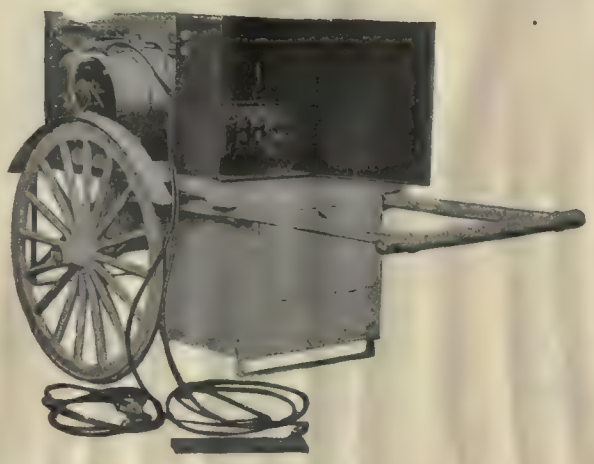
will do track or shop welding at lower cost than any other apparatus.

Saves Power

The Lincoln Arc Welder is simply a motor operated by current from the trolley wire. This motor in turn drives a generator which delivers current at 150 to 180 amperes. To do this the motor only takes 7 to 8 kw. power from the line.

In other types, the welding current is produced by "cutting down" the voltage of the line through a cast iron resistance. The excess power is wasted in the resistance and consequently 80 to 100 kw. must be taken from the line.

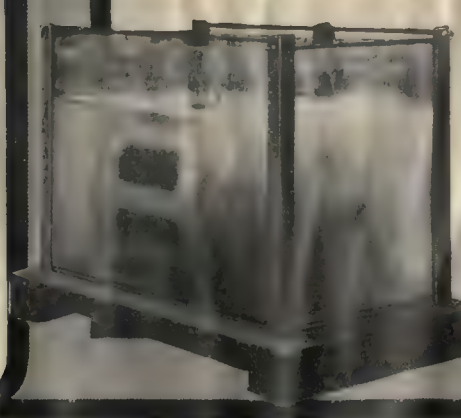
The Lincoln Arc Welder saves 70 to 90 kw. in power.



Faster Welding with the Lincoln Arc Welder the rail or piece to be welded is the positive electrode, hence it is always hot and the molten metal sticks to it readily. The operator can work much faster.

Saves Trolley Wire. The Lincoln Arc Welder taking only 7 to 8 kw. will not cause burning of the trolley such as frequently occurs when more power is taken.

Investigate the Cost of Lincoln Welding

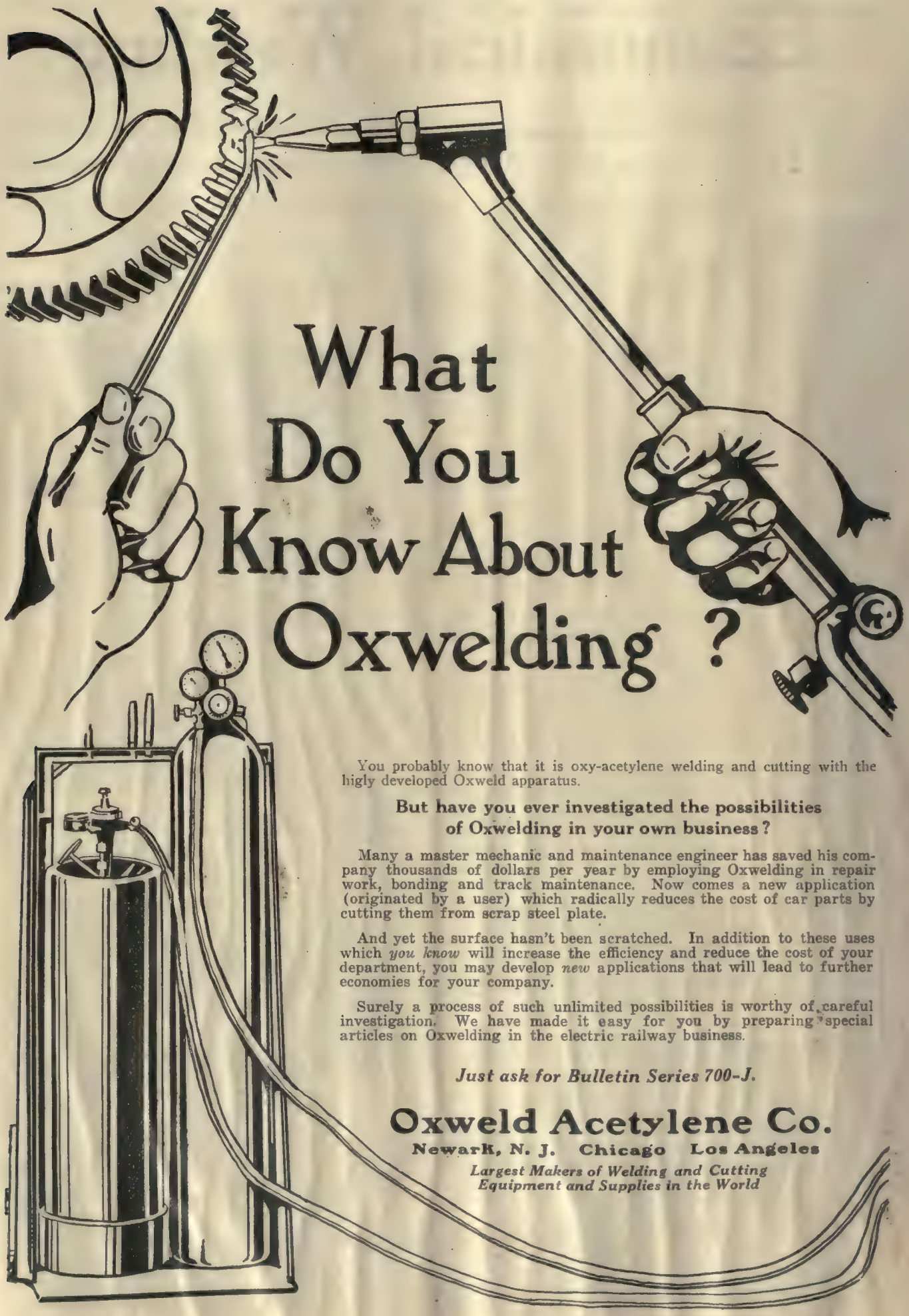


The Lincoln Electric Co.

Cleveland, O.

New York City (Singer Bldg.)
Buffalo
Grand Rapids
Chicago
Columbus
Detroit
Toronto, Canada
Philadelphia
Pittsburgh
Charlotte, N. C.
Syracuse

Agencies in other principal cities



What Do You Know About Oxwelding ?

You probably know that it is oxy-acetylene welding and cutting with the higly developed Oxweld apparatus.

But have you ever investigated the possibilities of Oxwelding in your own business?

Many a master mechanic and maintenance engineer has saved his company thousands of dollars per year by employing Oxwelding in repair work, bonding and track maintenance. Now comes a new application (originated by a user) which radically reduces the cost of car parts by cutting them from scrap steel plate.

And yet the surface hasn't been scratched. In addition to these uses which *you know* will increase the efficiency and reduce the cost of your department, you may develop *new* applications that will lead to further economies for your company.

Surely a process of such unlimited possibilities is worthy of careful investigation. We have made it easy for you by preparing special articles on Oxwelding in the electric railway business.

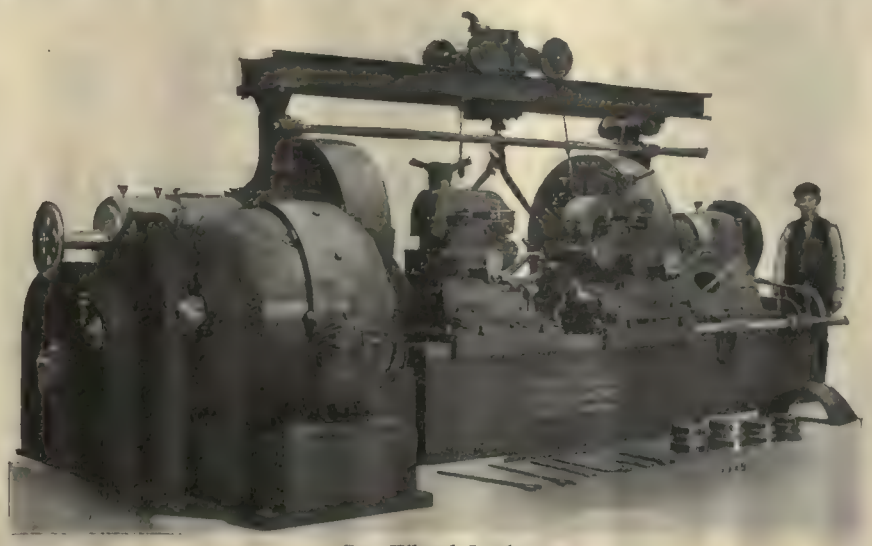
Just ask for Bulletin Series 700-J.

Oxweld Acetylene Co.

Newark, N. J. Chicago Los Angeles

Largest Makers of Welding and Cutting Equipment and Supplies in the World

Complete Machinery Equipment



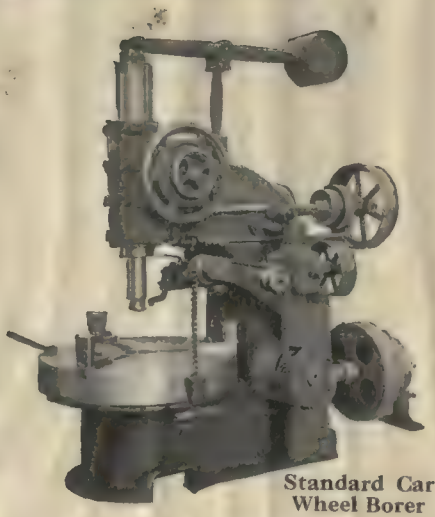
Car Wheel Lathe

For Electric Railway Repair Shops

A Car Wheel Lathe is probably the most important part of a Repair Shop equipment. The Car Wheel Lathe shown above is of heavy massive construction and is equipped with all the modern improved devices for the rapid handling and turning of steel car wheels. It is designed for wheels from 26″ to 42″ diameter and will take in axles having either outside or inside journals.

Right-hand head is traversed by a motor and has a friction safety device to prevent the possibility of accident in case the faceplates are brought up too forcibly against the wheels. A convenient calipering device, "Sure Grip" drivers and patented pneumatic tool clamps are provided.

We shall be pleased to send you descriptive circulars and catalogues showing all the various machines required for repair shop work.



Standard Car Wheel Borer



Car Wheel Press

NILES-BEMENT-POND COMPANY

111 Broadway, New York **25 Victoria St., London, S. W.**

SALES OFFICES AND AGENCIES—Boston: 93-95 Oliver St. **Philadelphia:** 405 N. 21st St. **Pittsburgh:** Frick Bldg. **Cleveland, O.:** The Niles Tool Works Co., 730 Superior Ave. **Hamilton, O.:** The Niles Tool Works Co. **Cincinnati:** The Niles Tool Works Co., 336 W. 4th St. **Detroit:** Kerr Bldg. **Chicago:** 371 W. Washington Blvd. **St. Louis:** 516 North Third St. **Birmingham, Ala.:** 2015 First Ave. **San Francisco:** 16 to 18 Fremont St. **For Colorado, Utah, Wyoming and New Mexico:** Hendrie & Bolthoff Mfg. & Supply Co., Denver. **For Seattle:** Hallidie Machinery Co. **For Canada:** The John Bertram & Sons Co., Ltd., Dundas, Montreal, Toronto, Winnipeg, Vancouver. **Japan:** The F. W. Horne Co., Tokio. **Italy:** Ing. Ercole Vaghi, Milan. **France:** Glaenzer & Perreaud, 18 Faubourg du Temple, Paris. **Russia:** S. G. Martin & Co., Ltd., Petrograd and Moscow. **Brazil:** Comptoir Technique Bresilien, P. O. Box 802, Rio de Janeiro.

75% Efficiency is 33⅓% Inefficient

A man or a machine only 75% efficient must do one-third better to be 100% efficient.

100% efficiency is not necessarily perfection—but, the standard of 100% is essentially the "best obtainable"—therefore, it is the basis for comparison of less efficient performance.

One of the most prominent industries in the United States, employing a large amount of Davis-Bournonville apparatus with much success, recently said—bantering the salesman about the price—"When we can get welding torches 75% as efficient as the Davis-Bournonville torches, at sufficiently lower price, we will consider them!"

Consider, yes! But the chances are they will not willingly employ tools, machines or men, that ought to be and could be 33⅓% more efficient than they are. This would mean that the 75% efficient man does in four days what he ought to do in three days—that the 75% efficient welding torch should give one-third better results than it does—and, if efficiency is based on both gas consumption and manual performance, that four tanks of oxygen are used when three would do the work, four hours' time consumed when three should have been enough, or, the welded job is only three-fourths as good as it ought to be—

also, 75% efficiency may mean loss of prestige and reputation for efficient performance.

Davis-Bournonville oxy-acetylene and oxy-hydrogen apparatus is the standard for efficiency, and has been since this company introduced the positive-pressure process of oxy-acetylene welding to the metal working industries in the United States, ten years ago—because it provides the highest efficiency obtainable, with the greatest development of apparatus, and most extended application in the metal working trades, and the widest range of equipment made for the use of the oxy-acetylene and oxy-hydrogen processes.

OXY-ACETYLENE WELDING
DAVIS
APPARATUS
DAVIS-BOURNONVILLE CO. N.Y.

Leads the World in Range, Efficiency and Apparatus in Successful Use

Davis-Bournonville Welding and Cutting Apparatus is in successful use by the most prominent concerns in the United States and Canada engaged in iron and steel production and metal working—foundries, rolling mills, ship yards, navy yards, scrap yards, railroad shops, locomotive and car shops, steel furniture, sash and door plants, tube mills, pipe and pipe bending works, by automobile and motor truck makers, manufacturers of automobile metal bodies, ornamental iron workers, on construction work and for wrecking, and in hundreds of small and large repair shops and garages, for welding and building up broken and worn castings.

(Our No. 3 factory building was completed and occupied in mid-summer, 1916, affording 30,000 additional square feet of floor space. We are now adding two more stories with 20,000 square feet more floor space, to keep up with the demand for "Davis apparatus.")

Davis-Bournonville Company

General Office and Factory: Jersey City, N. J.

Sales Offices: New York, Chicago, Boston, Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis, San Francisco, Toronto



"BOYS," said the General Manager at the luncheon Round Table one day, "a lot of great work has been done in fare collection these past years, but we're still a long way from getting all the money."

"Ye gods, we certainly need the coin more than ever, with 34-cent copper staring us in the face," muttered the Purchasing Agent.

"Yes, and our poor, old nickel has just been stretched to give another half-mile of riding to Hillcrest-on-the-Styx," said the treasurer with a sigh.

"Gosh, it can't be said we haven't tried," put in the Superintendent of Equipment. "Only the other day we sold a fine lot of railings and other fare-collecting junk that we had stuck in the cars at one time or another.

"How you can expect to train the public to a new system of fare collection every few months is the thing that's getting my goat," grumbled the Superintendent of Transportation. "And it gets the conductors up in the air, too."

"I've noticed," added the superintendent of timetables, "that some of those experiments slow down the line instead of speeding it up."

The General Manager laughed. "Boys, it looks as if I started something when I mentioned fare collection. Well, I'm going to try once more, but this time it's going to be

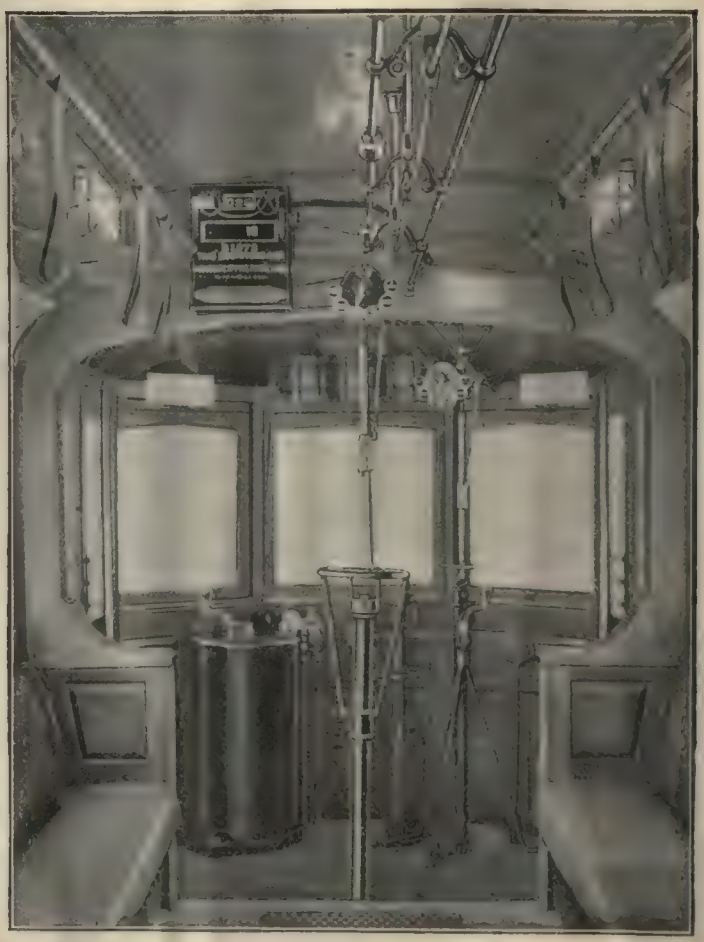
"A fare collection system that won't cost us anything for new equipment, that won't call for changes in the cars, that has no register ropes or rods, that doesn't puzzle the passenger one minute, and that GETS THE MONEY. I refer to the

Rooke Automatic Register!

"Let's talk further about it at our next luncheon."

Rooke Automatic Register Co., Providence, R. I.

The Ohmer System



An Ohmer Fare Register equipment adapted to one man, two man, pay as you enter or pay within operation.

THE Ohmer System is a success because it constrains the conductor to collect the right fare, to register it correctly and turn it in, irrespective of its registration.

The Ohmer System is a success because it recognizes the tendencies to fail on the part of the conductor and eliminates those tendencies by a system of registration which makes unpaid fares, unregistered or misregistered fares so evident that they are avoided.

The Ohmer System is a success because it eliminates the unworthy conductor, because it makes an efficient man and a "salesman of transportation" out of the man who is worth while.

Ohmer Fare Register Company

Dayton, Ohio



Boston's Latest Rapid Transit Extension—
"South Station Under"—
Was Opened for Traffic December 3

With the opening of this new station, the Boston Elevated Railway has brought Harvard Square, Cambridge, within about 10 minutes' ride of South Station. It is interesting to note that this, as well as most of the other prepayment stations of the Boston Elevated, is equipped with

International
Motor-Driven Station Registers

which have proved unsurpassed in speed and accuracy.

You, too, will save money and schedules by doing away with tickets for your station, parks, ferry and other prepayment areas and adopting International Station Registers.

OTHER INTERNATIONAL PRODUCTS

We also manufacture Round and Square Registers; Portable Registers; Fare Boxes for all kinds of Fare Combinations: Coin, Ticket and Transfer Registers; Transfer-Issuing Machines and

HEEREN ENAMEL BADGES

The International Register Company
15 South Throop Street, Chicago

Increased Safeguards of Fare Collection

The American Fare Box simplifies and perfects prepayment fare collection by combining fare box and fare register, with provisions to collect and register coins and paper tickets through the fare box, and registering transfers and other fares "collected over the box" on the same mechanism.



TYPE A
Coin-Ticket Registering Fare Box. Size 9½ in. x 6½ in. x 17½ in. Weight 32½ lbs.

Passengers pay the fares—coins and tickets, direct into the fare box—the fares being exposed for visual examination—*there is no intermediate handling of coins or tickets between payment and registration.*

The fares are registered immediately as paid—whether it is a coin or ticket paid into the box, or a fare collected over the box, one turn of the operating handle for each fare, indicated by a bell, makes the registration.

There is no accumulation of coins in the registering mechanism; no "grinding" of coins through the fare box between stops; no divided attention of conductors between fare box and overhead register, and no change required in the form of tickets used.

The full passenger load is indicated each trip on the fare box trip register; total registrations on the total-passenger register; and money registrations on the cash register. Nickels and dimes, as registered, are available for change. Pennies are not registered, but are segregated from full fare coins and deposited in a locked box; tickets also are deposited in a locked box.

The American Fare Box increases the safeguards of fare collection. It is the fare box conditions demand—one registering device, simple and reliable in construction and operation, for all requirements.

The boxes can be furnished in the types illustrated.

This is the fare box to investigate.



TYPE B
Coin Registering Fare Box. Size 7½ in. x 6½ in. x 16 in. Weight 27 lbs.



TYPE C
Special Fare Box with overhead Trip Register and separate Transfer Register operated direct from fare box handle

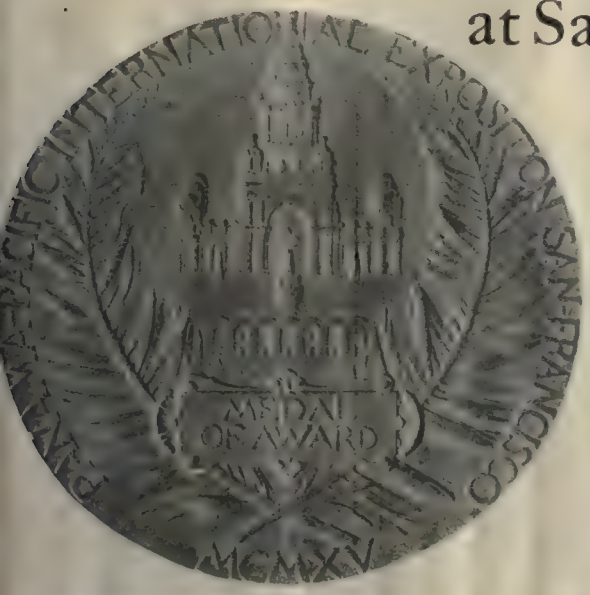
The American Railways Equipment Co., Dayton, Ohio

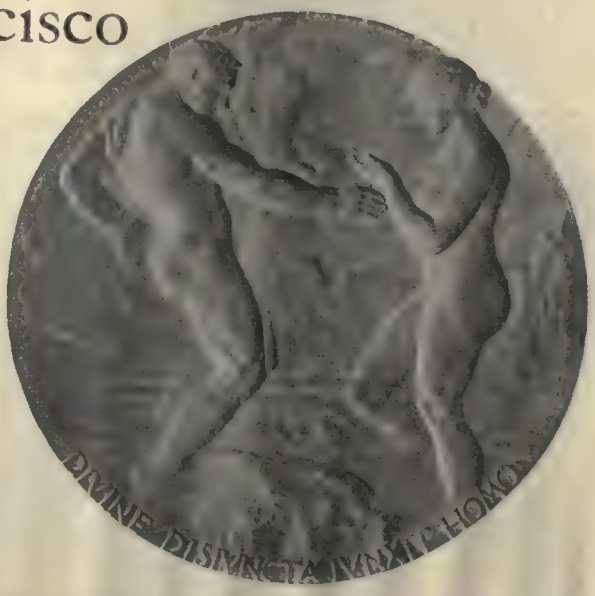
Awarded Medal and Diploma

at San Francisco 1916

"Walkover"

The Seat that always leads





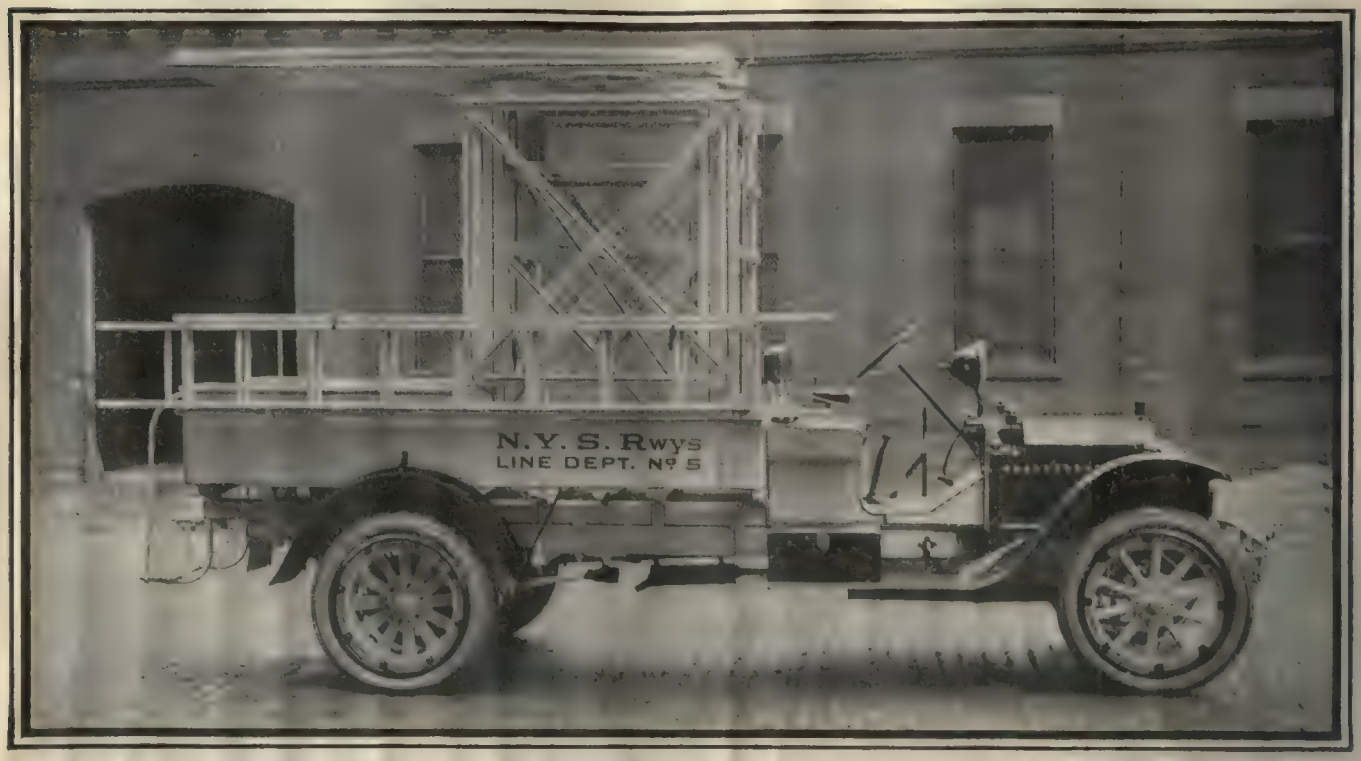


Pioneers in Steel Trim for Passenger Cars, including interior finish, steel doors, etc.

Hale and Kilburn Co.

Philadelphia New York Chicago
Washington San Francisco

WHITE TRUCKS



One of the four White Trucks owned by the New York State Railways, Rochester, N. Y.

A Significant Fact

While predominating in the total number of motor trucks annually put into service in this country, most of the White output is absorbed by repeat orders from satisfied users—regardless of price competition.

THE WHITE COMPANY
CLEVELAND

Largest Manufacturers of Commercial Motor Vehicles in America

Make It Easy to Attain Efficient Car Operation



Good car operation is simply a matter of fundamental principles and methods of execution. You can't expect motormen to develop these principles on their own initiative, but you can *teach* them to employ the correct methods.

Trained motormen can effect big economies. You can readily train them—teach them the possibilities and limitations of modern equipment; and show them how to effect these economies.

And *the most modern step:* by installing ECONOMY Meters on your cars, you can obtain data which will measure the efficiency of the motormen and the progress they are making.

This system of improving car operation has never failed. It's simple, economical, and without hazard. Large electric railways are accomplishing wonderful results every day. Let us give you the records of existing cases and submit a plan for improving *your* operation.

ECONOMY
BUILT LIKE A WATCH
METERS

Sangamo Electric Company
Springfield, Illinois
Specialists in Meters for Every Electrical Need

MILLER TROLLEY SHOE

On 60-Ton Locomotive Hauling Trains Up to 1200 Tons



MILLER TROLLEY SHOE TRANSMITTING CURRENT FOR FREIGHT TRAIN ON WATERLOO, CEDAR FALLS & NORTHERN RY.

The fact that the Miller Trolley Shoe is a most efficient current collector for high-voltage, heavy-train service is attested again in the case of the Waterloo, Cedar Falls & Northern Railway.

Here's a picture showing it in use on the 1300-volt section of this railway. The 60-ton locomotive used is equipped with four Westinghouse 308-D-3 275-hp. forced ventilation motors and HL control.

This locomotive, equipped with the Miller Trolley Shoe, hauls between Waterloo and Cedar Rapids, a distance of 60 miles, **trains up to 1200 tons,** at speeds up to 24 miles an hour on level track.

Join the many roads that are now using the Miller Trolley Shoe



Miller Trolley Shoe Company

53 State Street **Boston, Mass.**

SALES REPRESENTATIVES

Holden & White, Chicago.
W. F. McKenney, Portland, Oregon.
F. F. Bodler, San Francisco, Cal.
S. I. Wailes, Los Angeles, Cal.
Alfred Connor, Denver, Col.
T. C. White & Co., St. Louis, Mo.
W. M. McClintock, St. Paul, Minn.
A. I. Sanger & Co., Cleveland, Ohio.





3,000,000

BOUND BROOK

Graphite and Bronze Oil-less Bearings

U. S. Pat. Reg.

were made in this modern reinforced factory during 1916. With the early completion of our new works at Lincoln, N. J., for the exclusive manufacture of "Nigrum" impregnated wood bearings, our production will be increased to

5,000,000 Bearings in 1917



A Bound Brook Mold. The graphite cannot be forced out under pressure.

We take this occasion to thank our many electric railway customers for their confidence in our product, and to assure both old and new customers that our future service will be even better than in the past.

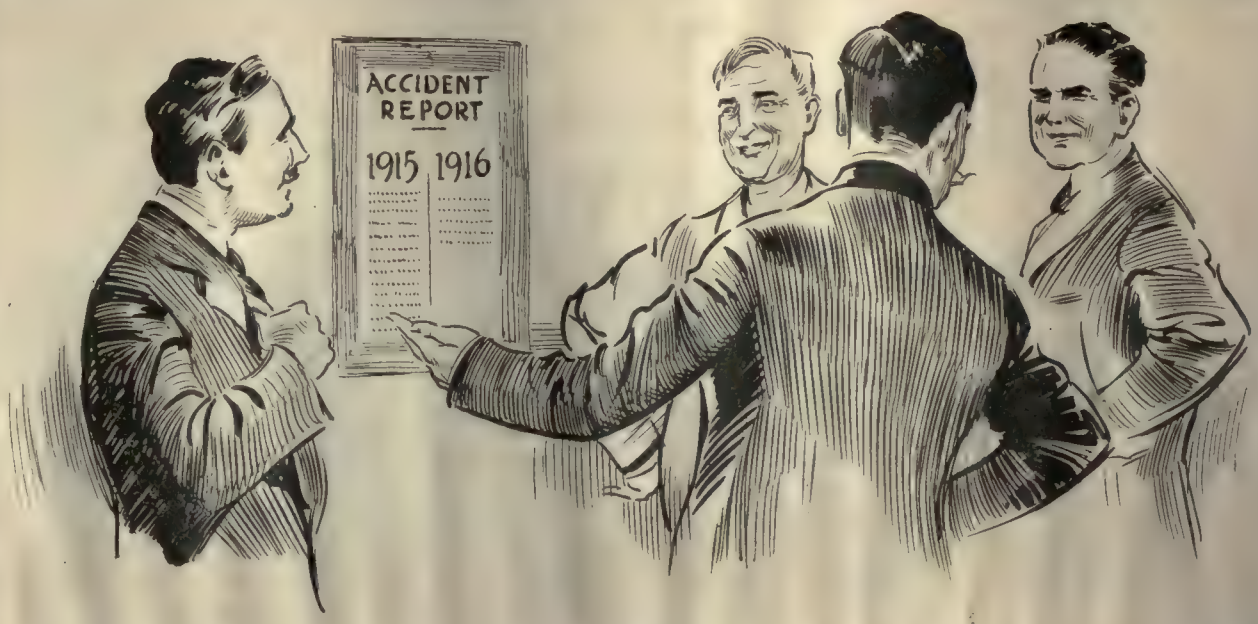
All genuine graphited "Oil-less" Bearings have always been made at Bound Brook, N. J., in the United States of America, by the



The end of a Bound Brook Bearing is lubricated to take care of end thrust.

Bound Brook Oil-less Bearing Co.

Formerly Graphite Lubricating Co.



"Account No. 92 will look a lot better,"

said the General Manager, as he scanned the comparison of accidents during 1915 and 1916. "Looks as if we were on the right track at last. Besides saving us a lot of accident expense, the H-B Life Guard and Providence Fender have changed a lot of newspaper knocks to boosts that will surely sweeten things with the public."

"Another thing I've noticed," remarked the Superintendent of Transportation, "is that we are getting more work and better work out of our motormen on the Marble Avenue line—they're more at ease now—don't lose their heads when they see a flock of kiddies playing on the tracks, because they know the H-B is on the job to protect everybody concerned."

"I'm might glad," rejoined the Claim Agent, "to see the more friendly attitude of the juries when we do have to let an accident case go to court—but that isn't often now. It's easy to convince everybody in court that *we* are doing *our* part to save life and limb, and that the *public* must do *theirs*, too. We're getting a square deal now."

"And as to repairing those H-B Life Guards and Providence Fenders," said the Master Mechanic, "it really costs next to nothing to keep them in A-1 shape."

"I'm glad to hear these boosts from you men," concluded the General Manager, "because they confirm my own judgment. When the Board of Directors meets next week, I'll recommend the installation of H-B Life Guards and Providence Fenders as standards throughout our system."

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.
61 Broadway, N. Y.

Fifth of a series of talks on Fewer Accidents and Better Public Relations



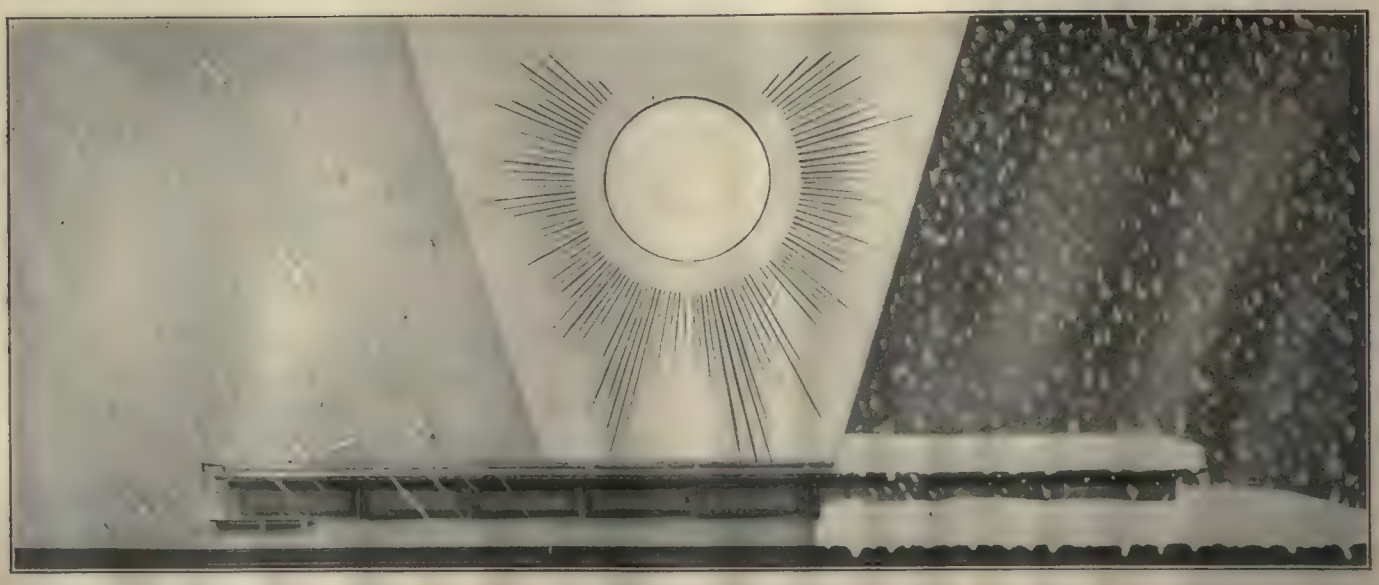
Like most of the leading electric railway companies of the United States

The Connecticut Company

regards Pantasote and Agasote products as "the standard"—and utilizes them accordingly in the new cars being built by the Wason Mfg. Co.

The Pantasote Company

11 Broadway, New York 797 Monadnock Bldg., San Francisco, Cal. People's Gas Bldg., Chicago, Ill.



For Real Protection Against All Weather Elements:

Bayonne Car Roofing

It will **not** deteriorate under the hot rays of the sun—it will **not** rot under rain or crack and peel under frozen snow.

It is no ordinary cotton duck, but a special, closely-woven fabric, every fibre of which is saturated with a weather-proofing, rot-proofing preservative.

This impregnation is a thorough-going mechanical process which makes it necessary for you to give Bayonne Roofing only **one** coat of color paint after it is attached to the car roof.

It's a **time**-saver in installation—a **money**-saver in maintenance. It renews the good looks of old cars—and makes new cars better, inside and outside.

Write for samples today

JOHN BOYLE & CO., INC.

112-114 Duane Street New York City 70-72 Reade Street

Branch House, 202-204 Market St., St. Louis, Mo.



Nevasplit Headlining

was installed in 10 new low-floor type cars built for the Pittsburgh Railways Co. by the Cincinnati Car Co.

Nevasplit Headlining provides a strikingly beautiful surface which is **permanent.**

It cannot warp, peel or fade under any conditions of service, and is waterproof in fact as well as in word.

Its low initial cost and maintenance cost should commend it to you for repairs and renewals as well as for new cars.

Write for samples and prices.

The Keyes Products Co., EQUITABLE BLDG. 120 BROADWAY, NEW YORK

New York, W. R. Kerschner Co., Inc., 50 Church St. Chicago, J. E. Simons, Fisher Bldg. San Francisco, Cal., D. E. Ford, Merchants' Exchange Bldg. Italy, American Traffic Company, via Capuccini No. 4, Milano, Italy





THE RYMCO



HIGHSPEED TROLLEY SWITCH AUTOMATIC

FOR INTERURBAN ROADS

Operates Simultaneously and Automatically with Track Switch and can be installed with any style of

OVERHEAD CONSTRUCTION

The systems on which this device has been adopted as Standard include the following:—

Illinois Traction System.
Peoria Railway Terminal Co.
Interstate Public Service Co.
Evansville Railways Co.
Ft. Wayne & Springfield Railway
Toledo & Chicago Interurban Traction Co.
Springfield, Troy & Piqua Railway Co.
Toledo, Bowling Green & Southern Traction Co.
Chicago, Ottawa & Peoria Railway
Bluffton, Genoa & Celina Traction Co.
Youngstown & Ohio River Railroad
Dayton & Troy Electric Railway
Toledo, Fostoria & Findlay Railway
Northern Ohio Traction & Light Co.
Cleveland, Southwestern & Columbus Railway
Toledo & Western Railroad Co.
Salt Lake & Utah Railway
Stark Electric Railroad Co.
Ft. Wayne & Northern Indiana Traction Co.
Indiana Union Traction Co.
Chicago, South Bend & Northern Indiana Traction Co.
Des Moines Interurban Railway
East St. Louis & Suburban Railway
Cedar Rapids & Iowa City Railway & Light Co.
Kentucky Traction & Terminal Co.
Winona Interurban Railway
Lake Shore Electric Railway
Ohio Electric Railway
Columbus, Delaware & Marion Railway
Muncie & Portland Traction Co.
Marion, Bluffton & Eastern Traction Co.
Kokomo, Marion & Western Traction Co.
Kansas City, Clay County & St. Joe Railway
Ogden, Logan & Idaho Railway

THE RAILWAY MATERIALS CO.

Railway Exchange, CHICAGO — Singer Building, NEW YORK



That Brand is Insurance of Uniform Service

You cannot get regular constant steady carbon brush **service** without high efficiency in the manufacture of the brushes.

Just remember that the measure of true **economy** is efficiency and price **combined.** You can never secure high service by depending upon price alone.

It is the absolute uniformity of efficiency in Le Carbone Brushes which differentiates them and makes them preferred by the men who appreciate most fully the importance of SERVICE.

We none of us ever appreciate insurance until "something goes wrong." The Le Carbone Brand is carbon brush insurance. And it's worth having.

W. J. Jeandron

173 Fulton St., New York

40 YEARS



OVER forty years' experience in laboratory and foundry practice is behind the MORE-JONES line of standard equipment for Electric Railways.

We are specialists in the compounding of metal alloys. Our research department has originated many new and valuable combinations, each one best adapted for a specific purpose. Our materials are the highest grade; our manufacturing methods careful and accurate.

We have studied the problems affecting electric railways in the closest and heartiest co-operation with the mechanical experts of various large systems. The most practical ideas that intelligent experiment and exhaustive tests have shown will lead to greater efficiency, longer service and reduced maintenance cost have always been sure of incorporation into MORE-JONES products.

"We invite inquiries and investigation."

The line includes

V-K Oilless Trolley Wheels
V-K Non Arcing Harps
Lubricated Trolley Wheels
M-J Standard Harps
Contact Springs
"Tiger" Bronze Motor Axle Bearings
"Tiger" Bronze Armature Bearings
"No. 36" Bronze Truck Journal Bearings
Air Compressor Bearings
"Armature" Babbitt Metal

MORE-JONES BRASS & METAL Co.
ST. LOUIS, U.S.A.

Tool Steel Gear and Pinion

Extract from a letter April 4th, 1916, written by the Superintendent Rolling Stock on a 3500 car property, to Superintendent Motive Power on a 2500 car property.

"Replying to your inquiry****, we have for the past three years had on test all of the better grades of gears and pinions that are manufactured. Prominent in our test are the Tool Steel Gear & Pinion Company, ***(Naming three other large companies)**. The result is*** that we have adopted as standard on our system the product of the Tool Steel Gear & Pinion Company of Cincinnati, Ohio. This test was run most carefully, and I will give you as follows the results that were obtained from the material under our observation from the beginning of test up to the present time."

Here follows detailed measurements, showing type of equipment, measurements of teeth when new, and after 94,667 miles, Tool Steel pinion teeth having given one-third of their allowable wear.

"I do not feel that it would be right for me to give you comparative figures of mileage made by other companies entering into this test*********. We have in service or on order several thousand gears and pinions manufactured by this company. Up to date we have not experienced a single case of broken teeth."



"Don't let a single overhauled car leave the shops until its brake rigging has been fitted throughout with

Boyerized Pins"

said the General Manager, as he and the superintendent of equipment were looking over the open cars and other equipment which were awaiting overhauling for the spring and summer drive.

"When you put in a requisition about a year ago for a sample lot of Boyerized case-hardened pins, the purchasing agent and myself wanted to know why the ordinary kind weren't good enough for you in these hard times.

"You've certainly *shown* us in great shape, not only on the Safety First basis but on the miles-per-dollars basis too.

"Judging by the way our first lot of Boyerized Pins has shown up," replied the gratified superintendent, "we're perfectly safe in making 'em standard. It's a great thing to feel that you're using Boyerized Pins because they are case-hardened so uniformly.

"We don't have to take chances any more with the stuff turned out by the average blacksmith."

BOYERIZED PINS

Constitute a Form of Safety Insurance which Returns the Premium Many Times Over

Other Products Are:

Bemis Trucks — Lord Baltimore Trucks
Case Hardened Brake Pins — Manganese Brake Heads
Case Hardened Bushings — Manganese Transom Plates
Case Hardened Nuts and Bolts — Manganese Body Bushings
Bronze Axle Bearings

Bemis Car Truck Co.

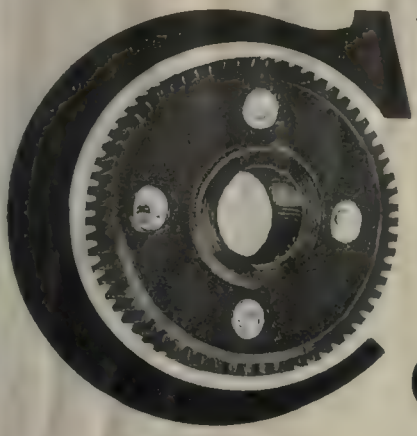
Springfield, Mass.





A new type of gear and pinion especially prepared and heat-treated, made from a material of fine quality steel blanks, both split, and sold at an exceptionally reasonable price.

Heat-Treated, Star Brand



Catskill

Gears and Pinions

are cut true to pitch, and then put through the special heat-treating process which gives them exceptional tensile strength and assures a wearing ability of from 3 to 5 times greater than that of ordinary gears and pinions.

Where heavy service is an absolute essential, specify Catskill Gears and Pinions.

May we send complete data?





W. R. Kerschner Co., Inc.

50 Church Street, New York



Columbia Babbitted Bearings Run True to Form



After a Columbia Babbitted bearing has gone through the rough cut the finishing cut and the inner planing,

The bore is carefully calipered to see that it is exactly right.

If the bore is right, the bearing is considered worthy to go out into the world as a member of the Columbia family as soon as the oil grooves have been cut therein.



The Calipers prove if the job was well done

And that's true of all the items listed below:

TOOLS

Armature and axle straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and field coils
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, rigging, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail contact-shoes and accessories
Trolley poles (steel) and wheels



Columbia Machine Works & Malleable Iron Co.



Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco

Some Applications of **NUTTALL** Railway Products



Here Is the Evidence

These and other important railway properties throughout the world have found by thorough test that Nuttall Railway Products give more and better service and at less cost per mile.

Their experience covers every operating condition and somewhere in all this varied experience is a solution for the problem that may now be troubling you. Let us suggest the proper gear, pinion or trolley for your particular condition and make a test for yourself.

Ask for Catalogues 12 and 13.

Gears **Pinions** **Trolleys**



NUTTALL
PITTSBURGH



The Van Dorn Automatic Car and Air Coupler



for City and Light Interurban Cars

Promotes Speed and Safety

Coupling

It speeds the work of making up trains by insuring a positive connection of both coupler and air under extreme variations of coupler positions, hence giving the greatest safety to employees.

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This operation is so simplified that the work can be done quickly and with maximum safety because the trainman need not be between or near the cars when the signal is given to move them.

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The long hose connections and the troubles ensuing from them are eliminated. The rigidity of the draft connections prevents see-sawing and makes two or more cars move as one. They operate perfectly on curves of 30-ft. radius and abrupt grades causing as much as 10 inches difference in normal coupler levels, without any binding whatever.

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In these freezing, drizzling days, your equipment inspectors have every temptation to skimp their work—to get their numbed hands and feet out of the cold and the wet.

Poor Inspection Is Dangerous

for, if there ever is a time when you want quick, sure and even brakeshoe application, it's **now.**

If you have Smith-Ward slack-adjusters on your cars today, you won't have to worry about that kind of trouble. If you haven't got them on your cars,

Order
S-W Brake Slack Adjusters

at your earliest opportunity. They will do for you what they are doing for many other roads.

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S-W Brake Slack Adjusters are made for any truck

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Keeping Pace with the Developments of Two Generations

Horse-car days.

We can all remember the frail little "match boxes" jerking and bouncing along a narrow-gauge "snake-trail" track behind one or two old broken-down cab horses. They tipped the scales at only one or two tons when loaded to capacity, and the speed seldom reached the hair-raising rate of 6 miles per hour.

Yet within this short space of years we have seen the electric car develop into a 60-ton palace, riding as smoothly as thistledown in the air at speeds as high as 70 miles per hour.

Do you fully appreciate the changes of the last 30 or 40 years?

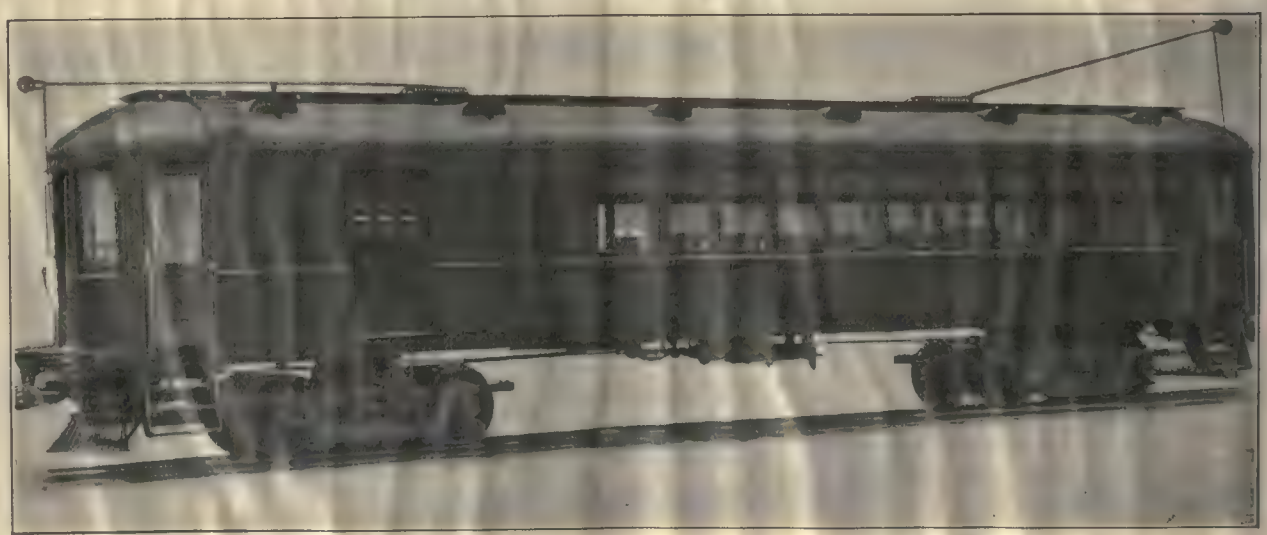
Can you comprehend what this ever-increasing service has demanded of the car wheel manufacturer?

Although the pace has been a hot one, we have never lost our stride, never lagged behind. The Wonderful Single-Service Chilled Iron Wheel was standard in the days of the "hobbie-horse" car, and is standard today with over 90% of the street-car companies of the United States and Canada which operate 100 cars or over.

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55 Ton High Speed Interurban Service



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Storage Batteries
in
Electric Railway Service

LOAD REGULATION

For carrying peaks and fluctuations of load, especially in connection with water-power developments or where power is purchased on the basis of maximum demand, the "Chloride Accumulator" or the "Tudor Accumulator" is adapted.

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Due to the present high price of copper there are cases where the use of a battery for maintaining voltage is more economical than the purchase of copper for feeders. The "Chloride Accumulator" has been largely used in this service by many railways.

STANDBY SERVICE FOR EXCITER BUS

It is standard practice to install a storage battery connected to the Exciter Bus to prevent interruption in the supply of current for field excitation. Either the "Chloride Accumulator," the "Tudor Accumulator" or the "Exide" Battery can be used.

OIL SWITCH SERVICE

Storage batteries are used in power houses and sub-stations for the operation of oil switches and supplying current for pilot lamps and emergency station lights in case of failure of the power supply. For this service the "Chloride Accumulator," the "Tudor Accumulator" and the "Exide" Battery are used.

STORAGE BATTERY STREET CARS

For infrequent service or for conditions where trolley wires are prohibited, storage battery cars offer the most economical and profitable solution of the transportation problem. The "Hycap-Exide" Battery has been largely used in this service. In New York City alone there are in operation nearly 200 storage battery cars equipped with "Hycap-Exide" Batteries.

MULTIPLE-UNIT CONTROL

The "Exide" Battery and the "Tudor Accumulator" are used by a number of railways for furnishing a supply of low voltage current to be used in connection with the operation of multiple-unit control systems.

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A number of interurban electric railway companies have installed batteries on their cars to maintain steady illumination and to overcome fluctuations caused by changes in line voltage, interruptions in third rails at crossings and switches or by temporary failure of power supply. For this service the "Exide" Battery is particularly adapted.

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The "Exide" Battery is being used in connection with head lights and tail lights for furnishing current in case of interruptions in power supply.

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Manufacturer of
The "Chloride Accumulator", The "Tudor Accumulator", The "Exide", "Hycap-Exide", "Thin-Exide" and "Ironclad-Exide" Batteries

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BUILT FOR SERVICE

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Baldwin Truck, Class 66-18-C. Built for New York State Rys. for city service.



Baldwin Truck, Class 84-30-AA. Built for Dayton & Troy Electric Ry. Co. for high speed interurban service.

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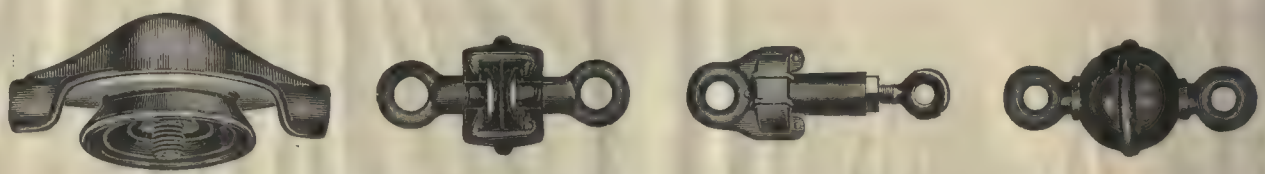
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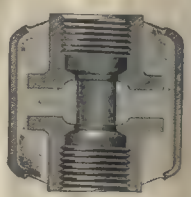
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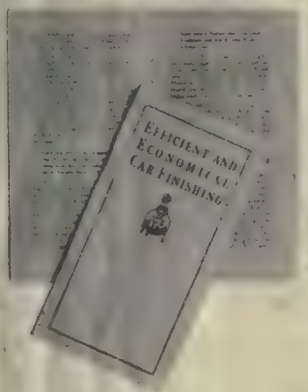
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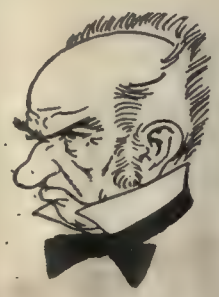
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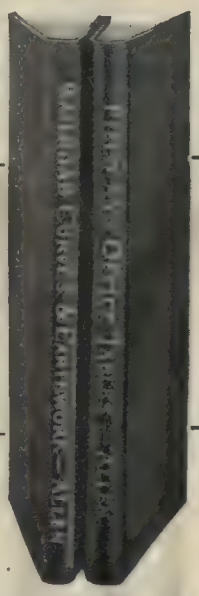
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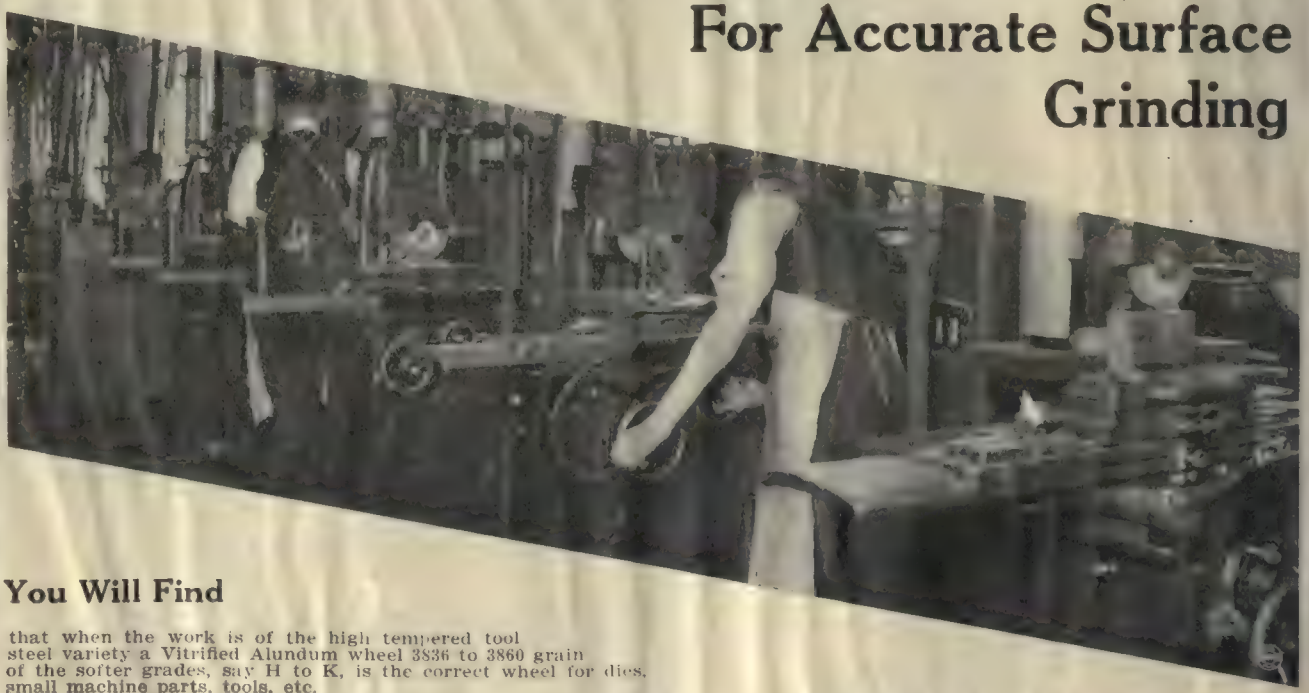
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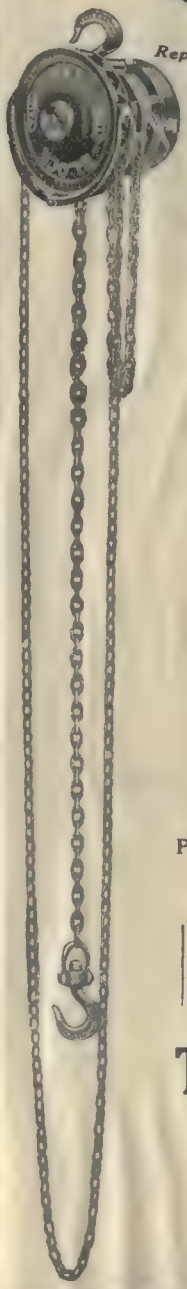
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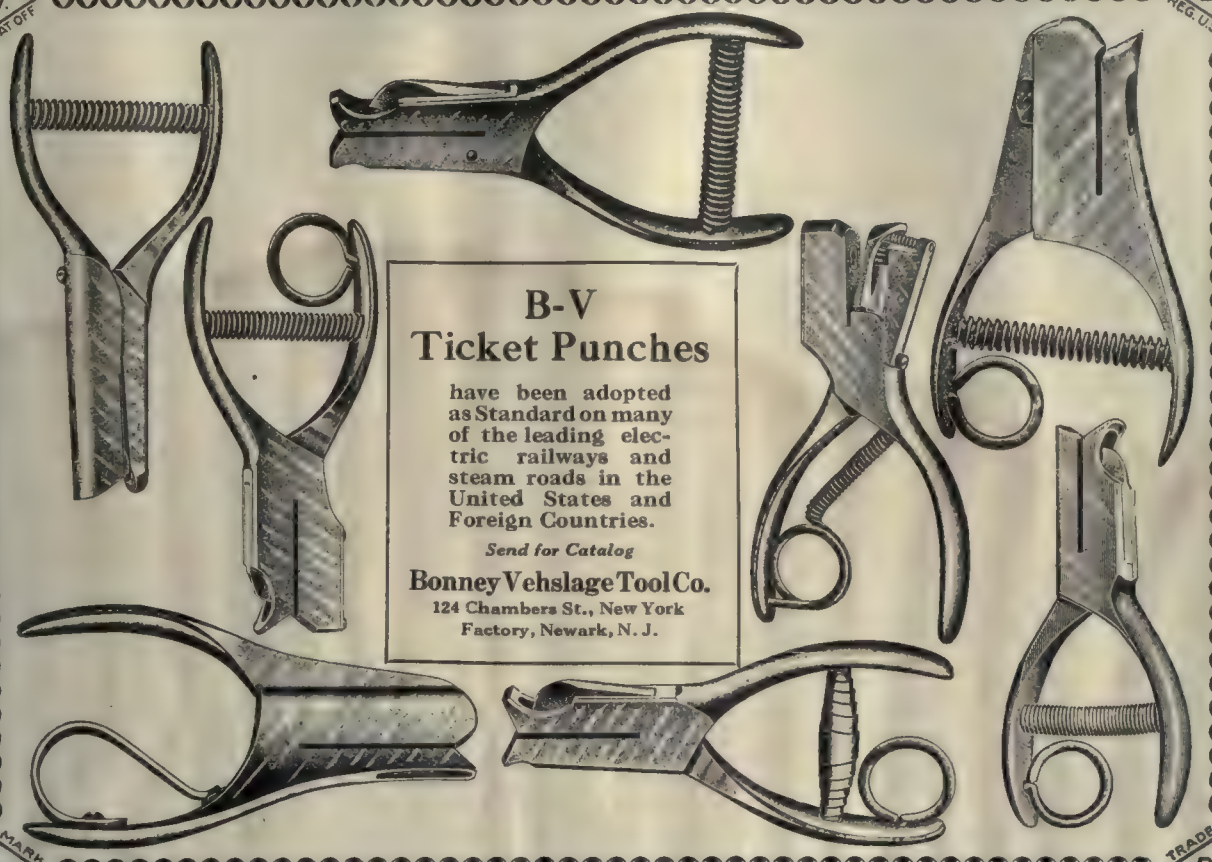
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If you've been accustomed to thinking of leather as the best car-seat covering, remember that the only leather that is within your available price-range is "coated splits," the soft, porous inner layers of the hide. Such leather may look well for a short time, but it soon cracks and peels.

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New York Municipal Railway
Type of car ... Passenger
Seating capacity ..... 78 to 90
Weight (car body only), 45,000 lb.
Bolster centers, length .... 47 ft.
Length of body:
Over vestibule ... 66 ft. 2¼ in.
Width over sills .... 9 ft. 9 in.
Over all ..... 10 ft.
Height, rail to side sills, 3 ft. ½ in.
Side sill to top of roof, 9 ft. 1⅝ in.
Body ..... Metal
Interior trim .. Steel and Agasote
Headlining ..... Agasote
Roof, type ..... Compromise
Underframe ..... Metal
Air brakes ..... Westinghouse
Axles, Carnegie quenched and tempered
Bumpers ... Hedley anti-climber
Cables, New York Municipal Railway's Specification
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Door ...
Gears and P...
Hand brakes ...
Heaters .....
Journal boxes .... M...
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Motors, outside or in... Inside ... truc...
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Railway Devices

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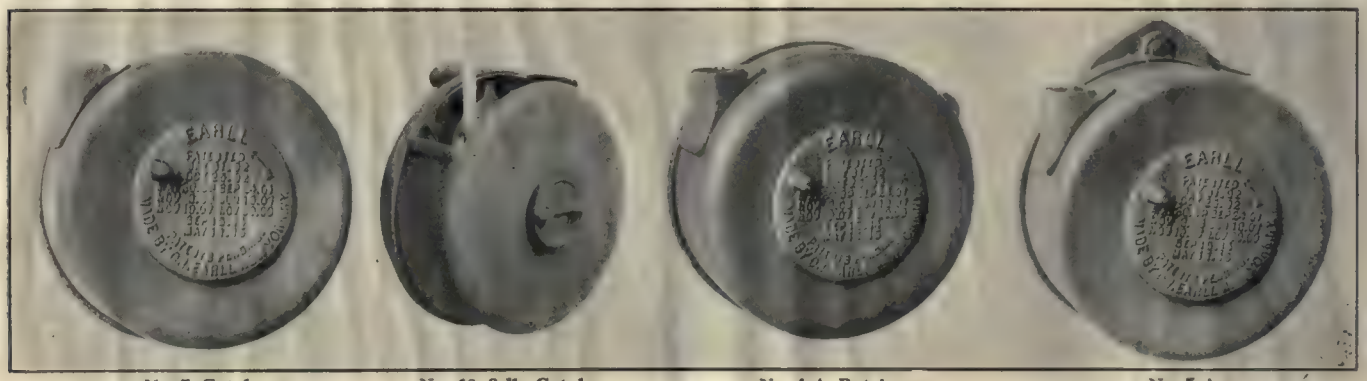
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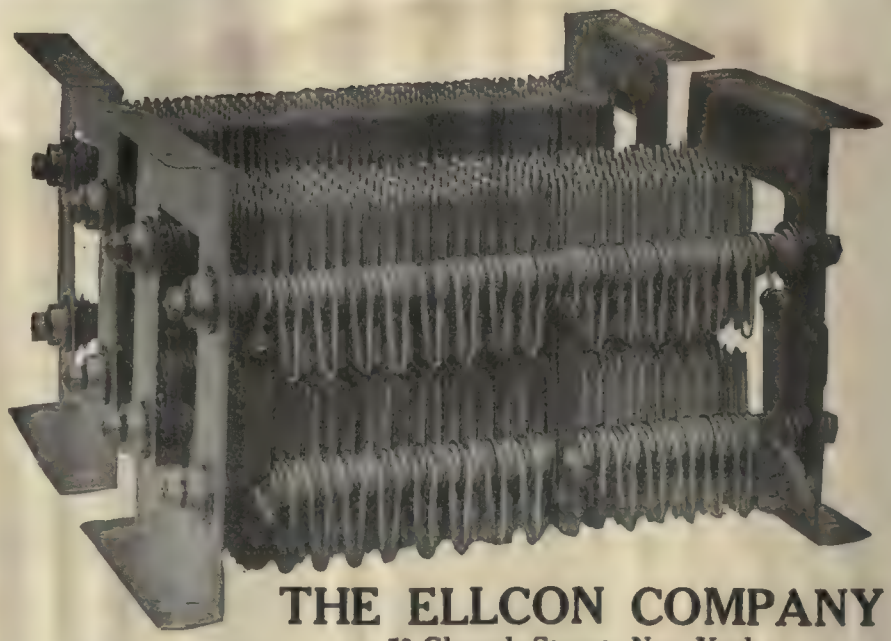
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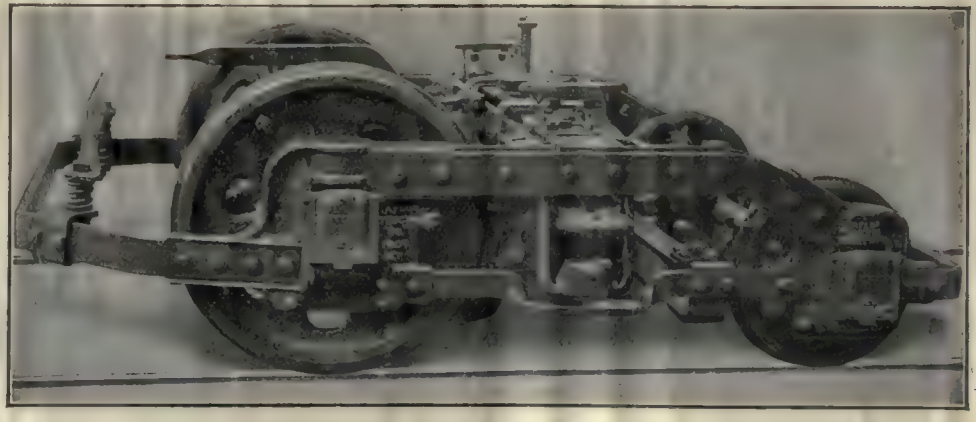
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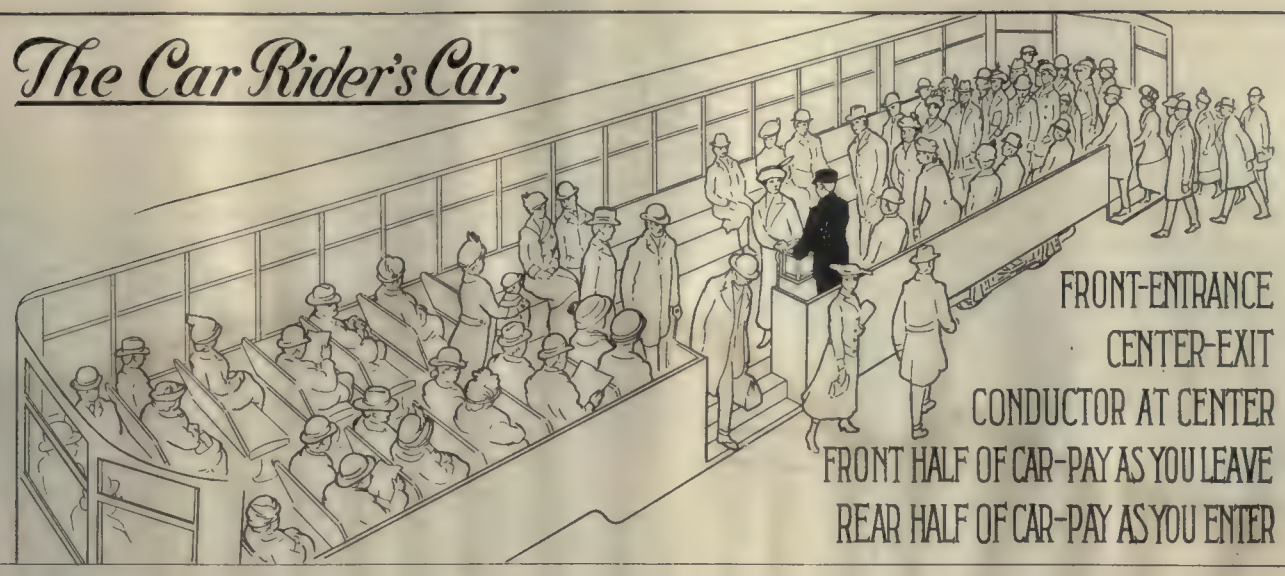
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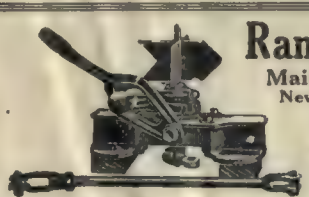
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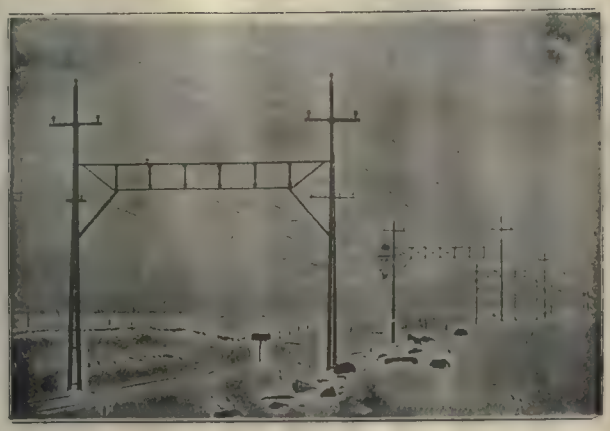
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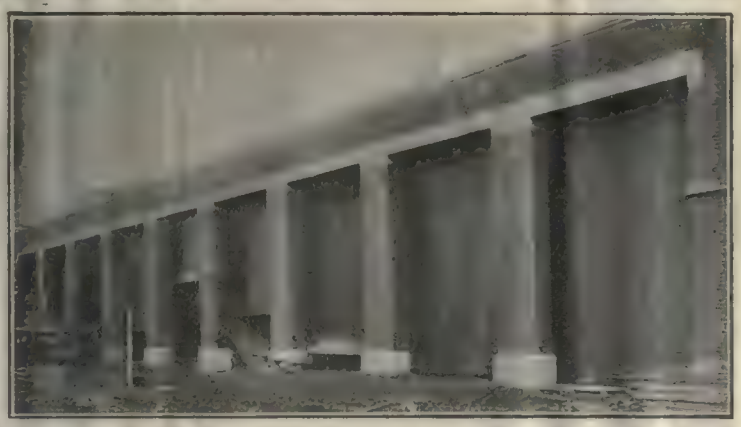
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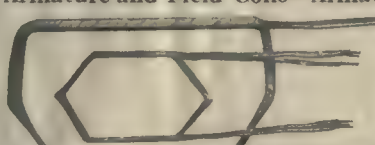
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Walpole, Mass.

For All Electrical Service Use P & B Varnishes, Insulating Compound, and Weatherproof Insulating Tape

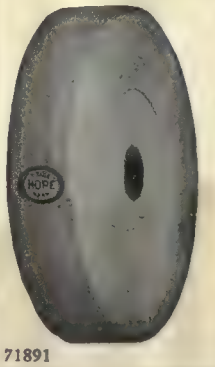
There's thirty-two years of experience behind products bearing the P & B trade mark.

TRADE P&B PAINT WATERPROOF PRESERVATIVE MARK Reg. U.S. Pat. Off.

Write for booklets describing P & B products for electric railways

The Standard Paint Company
Woolworth Building, New York
Boston Chicago Denver

If it's a Tape or Webbing You Want —Put it up to US



No matter what kind of electrical tape or webbing you need, we make it — in all weights, widths and textures. Get the Hope Sample Book and solve your webbing problems.

HOPE WEBBING CO.
PROVIDENCE, R. I.
396 Broadway, New York.
Consumers' Rubber Co.,
829 Superior Ave. N. W., Cleveland
Belden Mfg. Co.
23d St. and Western Ave., Chicago
T. C. White Co.,
1124 Pine St., St. Louis.

71891 4

The Acetylene Blow Torch
Prest-O-Torch



Quicker and cheaper than a gasoline blow-torch for brazing and soldering

For factories, repair shops, linemen, dentists, jewelers, the Prest-O-Torch saves time and money. Used with Prest-O-Lite Tanks—ready made gas. Intense, concentrated flame instantly lighted. No depreciation, safe and convenient. Style "A," price, 75c (Canada, 85c) will braze up to ⅝ inch round rod. Style "C" for heavier work, $2.25 (Canada, $2.75). Special styles for dentists. Write for literature or send order now. Money refunded if not satisfied.

The Prest-O-Lite Co., Inc. 805 Speedway Indianapolis, Ind.
Canadian Main Office and Factory, Merritton, Ont.

The Solution of Your Insulation Problem

is to be found in the insulating materials listed here, or in some one or more of the many other products of our plant. To take fullest advantage of the insulation service we offer, you should know the complete line.

Write today for descriptive bulletins.

PERFECT MICANITE INSULATOR REGISTERED

MICANITE
Commutator Insulators, Tubes, Washers, Rings, Segments, Sheets, Tapes, etc., made of imported mica

EMPIRE
Linseed oil treated Cambric, Linen, Silk, Canvas, Duck and Papers. High puncture voltage, long life.

LINOTAPE
Linseed oil coated tape both straight and bias cut for coil winding, cable splicing, bus bars, etc.

KABLAK
Black varnished Cambric, Linen, Silk, Canvas, Duck & Papers, Flexible, efficient under high temperature.

MICO
Untreated insulating fabrics, Papers, Fibres, Linen Tapes, Sleeves, Shellacs, Cements and Varnishes.

New York 68 Church St. **MICA INSULATOR CO.** Chicago 542 So. Dearborn St.



7232

Cameron Commutators Command Confidence. Why?

Because of the dense, high conductivity hard-drawn copper we put into the bars,
Because of the best-there-is quality of high grade Canadian amber mica we use in insulating the segments,
Because of years of specialized, commutator-building experience that makes our workmen experts in their line,
Because of the Cameron ideal of quality—and the painstaking inspection that guarantees it in every job we turn out.
Specify CAMERON for commutators, segments or coils.

Cameron Electrical Mfg. Co.
Ansonia, Connecticut

SERVICE—

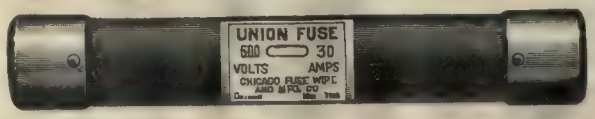
A much abused word that we interpret successfully.

We believe that "90% of all orders shipped same day received" is a good definition.

Try us on that requisition —NOW.

UNION ELECTRIC COMPANY
Electrical Headquarters
Terminal Warehouses Pittsburgh, Pa.

ENCLOSED FUSES A fuse is a small article when compared with the apparatus it protects, but on its performance depends the safety of this apparatus. The importance of reliable fuses is evident. "Union" fuses will give you good service.



NEW "UNION" CATALOG We have just issued our No. 28 catalog, which combines the former Fuse and Box catalogs. It contains much valuable reference information, also complete descriptions of fuses for railway service.

Write for a copy.

CHICAGO FUSE MFG. CO.
CHICAGO NEW YORK





Get Our Price Lists on **BADGES** and **PUNCHES**

AMERICAN RAILWAY SUPPLY CO., 134-136 Charles St., NEW YORK



Saved from the Ashes as many tickets are, means nickels lost to you. Avoid the risk.
Patten Ticket Destroyer is used right in the office under the eyes of trustworthy employes.
It mutilates beyond redemption.
Scrap sold will pay for the machines.
Ask us for Circular J.
PAUL B. PATTEN CO.
78 Lafayette St., Salem, Mass., U. S. A.

Heating and ventilating your cars is the problem today. Let us show you how to do both with one equipment. Now is the time to consider this change before you start your cars through the shops for overhauling. Kill two birds with one stone.
THE PETER SMITH HEATER COMPANY
1759 Mt. Elliott Ave., Detroit, Mich.

RAILWAY UTILITY CO.
Sole Manufacturers
"Honeycomb" and "Round Jet" Ventilators
for Monitor and Arch Roof Cars, and all classes of buildings; also
Electric Thermometer Control
of Car Temperatures.
721 W. FULTON ST. Chicago, Ill. *Write for Catalogue* 1328 BROADWAY New York, N.Y.

The Best Shade Rollers for Cars

SPECIAL shade rollers for cars, that will last and give satisfaction for years, and yet cost but little more than the poorest you can buy, are made by the Stewart Hartshorn Co., E. Newark, N. J. This company is by far the largest shade roller manufacturer in the world. It is able to give high quality at lower prices because of the enormous output. Write for catalog, stating wants. You are always protected when you buy shade rollers if they bear the signature Stewart Hartshorn



McLain No. 25 Headlight

is the lightest-weight headlight made—right in line with the latest practice of reducing weight of cars and car equipment

It is not only light, but strong, weather-proof and a surprisingly powerful illuminator.

Test it in comparison with any other headlight on the market and learn for yourself its points of superiority.

GET OUR 60-DAY FREE TRIAL OFFER

The Trolley Supply Co., Canton, Ohio



Johnson Registering Fare Boxes

used in connection with the car register increase receipts $1.00 per car, per day, counts metal tickets the same as cash thus giving a positive check on all class of fares.

WRITE FOR NEW BOOKLET

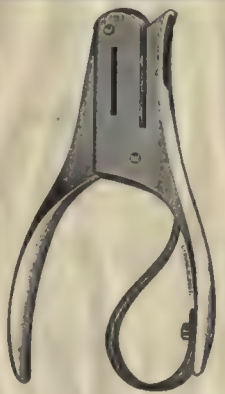
JOHNSON FARE BOX COMPANY

Jackson Blvd. & Robey St. Chicago, Ill.

U. S. Metal & Manufacturing Co. 165 Broadway, New York City, N.Y.

Cleveland Fare Boxes

Cleveland Fare Box Co.
5318 St. Clair Avenue
Cleveland, Ohio



Our forty years of successful punch making are well demonstrated in the perfection of our product, which is Standard throughout the world.

These punches prove the most efficient, because they operate quickest and easiest, and the most economical because they wear longest.

Let us show you WHY.

Punchmakers since '72.

R. Woodman Mfg. & Supply Co.
82 Sudbury St., Boston, Mass.



E. G. Long Co., 50 Church St., New York City
Eastern Electrical and Export Representatives.

WE CAN CUT YOUR COST OF HEATING CURRENT

WRITE FOR THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.

VENTILATORS Also Ventilate in Stormy Weather.

THERMOSTATS Save Current.

ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.

ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

Gold Car Heating & Lighting Co., 17 Battery Pl., New York

Use UNIVERSAL ANTI-SLIP METAL TREADS

on your cars and station steps.

Universal Safety Tread Company
Waltham, Mass.



MASON SAFETY TREADS—prevent slipping and thus obviate damage suits.

KARBOLITH CAR FLOORING—for steel cars is sanitary, fireproof and light in weight.

STANWOOD STEPS—are non-slipping and self-cleaning.

Above products are used on all leading Railroads. For details address

AMERICAN MASON SAFETY TREAD CO.

Main Offices: Lowell, Mass.

Branch Offices: Boston, New York City, Chicago Philadelphia, Kansas City, Cleveland, St. Louis.



See the Crank of the

CREAGHEAD DESTINATION SIGN

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

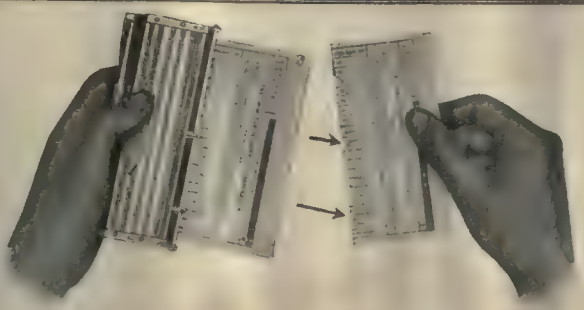
CREAGHEAD ENGINEERING CO., CINCINNATI, O.

Have you our new

Trolley Wheel Bulletin

Write for your copy

The Eureka Company North East, Pa.



No Chance for Deceit or Dispute

Due to hand punching or notching which puzzles the passenger or which can be read different ways.

Macdonald Ticket Boxes

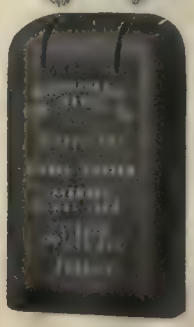
Produce a passenger's ticket and auditor's stub which tell exactly the same story to the passenger, the conductor and the auditor.

And the stubs are tamperproof, too.

Convince yourself by ordering one box!

The Macdonald Ticket & Ticket Box Co.
Cleveland, Ohio

The Doors Are Closed—Go Ahead!



—And the Motorman Gets It —RIGHT

Consolidated Safety Starting System

When this little light alongside the controller flashes, he is *sure* that all doors have been closed. and that no passenger can be getting on or off when the car is started.

Ask the claim agent—*he* knows.

Consolidated Car-Heating Co.
New York Albany Chicago

TULC

MANY SYSTEMS ARE USING TULC after first making most thorough tests under all conditions. Such tests have shown that it will cut lubrication costs in half.

THE UNIVERSAL LUBRICATING CO.
Schofield Building CLEVELAND, O.

TRADE DAUM MARK

Renewable Fuses

Really renewable. Not the kind that waste more time filling than new fuses are worth. but the kind that save 60 to 80 per cent on cost of non-renewable cartridge fuses. The right kind.

Send for sample and literature.

A. F. DAUM

Sole Manufacturers, Pittsburgh, Pa.

Makers of the First Successful Refillable Fuse on the Market.
Members Society for Electrical Development

Ventilation—Sanitation—Economy—Safety

All Combined in

THE COOPER FORCED VENTILATION HOT AIR HEATER

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

THE COOPER HEATER CO., CARLISLE, PA.

The Eclipse Railway Supply Co.
CLEVELAND, OHIO

Manufacturers of the

ECLIPSE LIFE GUARD **ECLIPSE WHEELGUARD**
ECLIPSE TROLLEY RETRIEVER **ACME FENDER**

THE readers of technical papers are busy men. Don't expect one flash of the Searchlight to reveal them all—or one insertion of your advertisement to be read by them all. **Order your Want or For Sale Advertisement published four times or more.** If all of the insertions are not needed we will return the full amount received for whatever space is not used.

Searchlight Department,
ELECTRIC RAILWAY JOURNAL

Service

You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

American Brake Shoe & Foundry Co.
30 Church St., New York
McCormick Bldg., Chicago Chattanooga, Tenn.

The Men Who Plan and Execute

owe some of their efficiency to the thought, energy and resourcefulness of manufacturers who supply the means for such achievements.

These men know how important it is for them to keep in touch with the manufacturers.

In the electric railway industry, such men find the easy, certain and thorough way to keep in touch with manufacturers is through the advertising pages of the

Electric Railway Journal
239 West 39th Street New York

UNION SPRING & MFG. CO.

SPRINGS
COIL AND ELLIPTIC
M. C. B. Pressed Steel Journal Box Lids

General Office: First Nat'l Bank Bldg.
PITTSBURGH, PA.
Works: New Kensington, Pa.
50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

LONGWEAR BUSHINGS
For Brake Gear

Hardened Steel Accurate Uniform



also LONGWEAR BRAKE PINS to Specifications

E.G. Long Company
50 Church Street New York

"FROZEN AIR"

is preventable with denatured alcohol injection into the air brake system.

If you have been encountering serious troubles from this cause, do not permit this winter to go by without testing out our

RECTIFIER

National Safety Device & Mfg. Co.
2415 Smalley Court, Chicago, Ill.
Eastern Electric Railway Agent
LORD MANUFACTURING CO., NEW YORK

Wheel Condition No. 2

When the Flange and outer portion of tread need truing use this style of



Pat. May 31, 1898; Sept. 1, 1903; Aug. 2, 1904; Dec. 29, 1908; June 15, 1909; April 21, 1914.

Wheel Truing Brake Shoe

You need not keep a crew of men for wheel removal and machines for wheel truing if you use our wheel Truing Shoes.

Wheel Truing Brake Shoe Co.
Detroit Michigan

The engineering departments of these railways made a thorough investigation—then selected

Foster Superheaters

—and most of these companies have supplemented their first decision with repeat orders.

Berkshire Street Railway Company
Bay State Street Railway Company
The Connecticut Company
Cleveland, Southwestern & Columbus Railway Co.
Charleston Consolidated Railway & Lighting Co.
The Cleveland Railways Company
El Paso Electric Railway Company
Fort Dodge, Des Moines & Southern Railway Co.
Galesburg Railway, Light & Power Company.
Havana Electric Railway, Light & Power Company
Iowa Railway & Light Company
Illinois Traction Company
Ithaca Traction Corporation
Jamestown Street Railway Company
Kentucky Traction and Terminal Company
Lackawanna & Wyoming Valley Railway Co.
Mesaba Railway Company.
Metropolitan Street Railway Company (Kansas City, Mo.)
Milwaukee Electric Railway & Light Co.
New York, New Haven & Hartford R. R. Company
Philadelphia & Western Railway Co.
Philadelphia & West Chester Traction Co.
The Rhode Island Company
Rome Railway & Light Company (Georgia)
Republic Railway & Light Company
Reading Transit & Light Company
Rochester Railways and Light Co.
Stone & Webster Engineering Corp.
Shore Line Electric Railway Co.
Terre Haute Traction & Light Company
Toledo Railways & Light Company
Virginia Railway & Power Company
Wisconsin Traction, Light, Heat & Power Co.
Worcester Consolidated Street Railway Co.
Winnipeg Electric Railway Co.
Wilmington & Philadelphia Traction Co.
Waterloo, Cedar Falls & Northern Railway Co.

Low repair costs, constant service and uniform superheat—that's why.
It will pay your engineering department to investigate, too.

POWER SPECIALTY CO.

111 Broadway, NEW YORK

Boston Philadelphia Pittsburg Chicago San Francisco

The St. Louis Car Company

QUALITY SHOPS

8000 N. Broadway
St. Louis

THE CINCINNATI CAR COMPANY

WORKS:

WINTON PLACE
CINCINNATI, OHIO

SEARCHLIGHT SECTION

IMMEDIATE SHIPMENT

400 Kilowatt 60 Cycle Rotary Converter

1—400 KW. Westinghouse, 3 ph., 60 cy., 370 v. A. C., 575 v. D. C., speed 600 revolutions.

200 Kilowatt 60 Cycle Rotary Converters

2—200 KW. Westinghouse, 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 rpm., with starting motors, also transformers if desired.

150 Kilowatt 60 Cycle Rotary Converters

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

150 Kilowatt 25 Cycle Rotary Converters

2—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

Transformers

3—185 KVA. Gen. Elec., type A. C., 25 or 60 cycles, 2300 volts primary, 430 volts secondary.

4—125 KW. Westinghouse transformers, single phase, 60 cycles, 15,000 volts primary, 340/360 v. secondary.

4—100 KW. Westinghouse transformers, oil insulated, single ph., 60 cy., 2300 v. primary, 360 v. secondary.

4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. primary, 430/362 v. secondary.

3—75 KW. Westinghouse, oil insulated, 60 cycle, 6600 or 13,200 v. primary, 220 v. secondary.

Railway Motors

2—75 to 90 HP. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

IMMEDIATE DELIVERY

ARCHER & BALDWIN

114-118 Liberty Street New York City

TELEPHONE 4337-4338 RECTOR

86 Ton Electric Locomotive

Built by The General Electric Co.

Rating 808-E-172-4GE94-600 V.

Dimensions and Weights:

Length inside knuckles	35′ 2″
Length over cab	32′ 6″
Height over cab	12′ 1″
Width over all	10′ 1″
Total wheel base	29′ 0″
Rigid wheel base	12′ 0″
Track gauge	4′ 8½″
Total weight	172,500 lbs.
Weight on drivers	117,200 lbs.
Maximum safe speed	60 MPH.
Minimum radius curvature	150 ft.

EQUIPMENT:

Four G.E.-94 bipolar gearless motors with type M multiple unit control; combined straight and automatic air brake; two 16″ electric headlights; air operated bell; whistle; pneumatic sanders, etc.

SPEEDS:

Control equipment is arranged for three economical running speeds; slow for switching service, medium for freight service and high speed for fast freight and passenger service.

MacGovern and Company, Inc.

114 Liberty Street

New York City

WANTED

Will pay cash for any or all of the following apparatus intended for reinstallation: Two watertube boilers 350 to 400 H.P. each, 160 lbs. or better working pressure, two individual steel stacks or single stack for both boilers. One 25 KW motor driven exciter and one 50 KW steam driven exciter, feed water heater, pumps, piping, etc. Give price, location and complete description. No dealers.

Address: Box 1310, Elec. Ry. Journ.

Advertisements for the

Searchlight Section



Can be received at the New York Office of the Electric Railway Journal until

Wednesday Noon

For Issue of That Week

CARS FOR SALE

OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full Particulars to

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg. Philadelphia, Pa.

COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD STREET RAILWAY MOTORS

GET OUR PRICE WE CAN SAVE YOU MONEY

America's Greatest Repair Works

CLEVELAND ARMATURE WORKS, Cleveland, O.

Get Your Wants into the Searchlight

SEARCHLIGHT SECTION

Get your Wants into the Searchlight

ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word**, minimum charge 50 cents an insertion, **payable in advance.**

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word**, minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

⅛ p. (1½x3⅜ ins.)	$5.00	1 in. (1x2⅛ ins.)	$3.00
¼ p. (2⅛x3⅜ ins.)	10.00	4 inches (4x2⅛ ins.)	11.60
½ p. (5x3⅜ or 2⅛x7 ins.)	20.00	8 inches (8x2⅛ ins.)	22.40
½ p. (10¼x3⅜ or 5x7 ins.)	40.00	15 inches	40.50

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

1 page	$80 a page	18 pages	$56 a page
3 pages	72 a page	26 pages	52 a page
6 pages	64 a page	32 pages	50 a page
9 pages	62 a page	40 pages	48 a page
12 pages	58 a page	52 pages	45 a page

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE

Armature Coils

3 Sets GE-1200 Railway Motor Armature coils. Catalog No. 18069. Immediate shipment. If interested address Hagerstown & Frederick Ry. Co., Terminal Bldg., Frederick, Md.

Immediate Delivery

Boiler feed pump, capacity 75 gal. per minute, against a 500-ft. head at 3200 r.p.m. Dayton Turbine pump, direct connected to Kerr steam turbine. Mesaba Railway Co., Virginia, Minn.

No 18. Dorner Trucks

Prefer to sell frames only without wheels or axles at $50. Good condition. Address U. T. Co. of Indiana, Anderson, Indiana.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.



Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

For Sale Cheap

STEEL RAILS

300	tons	68 lb.
650	tons	58 lb.
800	tons	52 lb.
600	tons	40 lb.
400	tons	35 lb.
500	tons	30 lb.
800	tons	20 lb.

Also large quantities of other sections

These are practically as good as new and at a fraction of the cost.

Before Buying
LOCOS, CARS, EQUIPMENT, MACHINERY, TANKS, ETC.
see what Zelnicker offers.

ZELNICKER IN ST. LOUIS
423 First Nat'l Bk., Chicago
910 Hennen Bldg., New Orleans
Main Office, 425 Locust St., St. Louis

FOR SALE

Transformers for Sale

Six 350 K.V.A. 60 cycle, Type H single phase General Electric Co. transformers, 2400-2300-2200 volt primary; 200-400 volt secondary. New. These can be Y connected for use with 300 or 600 volt rotaries. Box 1308, Elec. Ry. Jour.

MISCELLANEOUS WANTS

Electric Locomotive Wanted

Des Moines City Railway Company, Des Moines, Iowa, is in the market for one second-hand electric locomotive operating on a standard gauge track 4 ft. 8½ in., 500 volt. Weight from 45 to 55 ton, 4 motors from 100 to 125 H.P. capacity.

Motors Wanted

Four G.E. 57 Type H two-turn motors, with or without armature and field coils. Holden & White. 1508 Fisher Bldg., Chicago.

Transformers and Rotary Converter

2—100 K. W. or 2—75 K. W., 60 cycle transformers, wound for 33,000 volts on primary side and 370 volts on secondary side. Also one 200 or one 300 K. W., 3 phase, 60 cycle, rotary converter. State make, condition, location and delivery. Elgin & Belvidere Electric Co., 105 S. La Salle St., Chicago, Ill.

Your Advancement

is largely in your own hands—it is doubtful if any one else is worrying over it

Better positions are constantly being secured through small advertisements in the "Positions Wanted" Columns of *Electric Railway Journal.*

60 cents for 20 words

POSITIONS WANTED

ACCOUNTANT—Eleven years' experience Street Railway, Electric Lighting and Gas, both Construction and Maintenance. Married, 30. Best reference from present employer. Desire change about February 1st. Box 1314, Elec Ry. Jour.

EFFICIENT manager of railway and lighting properties open for engagement. Can put your road on paying basis. Salary, $6,000. Box 1315, Elec. Ry. Jour

GENERAL foreman wants position. Married, 35, reliable, experienced. Now assistant general shop foreman for city and interurban road. References. Box 1294, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

GENERAL manager electric railway and lighting properties open for position. Twenty years' experience handling properties for large banking concern. Box 1236, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

SUPERINTENDENT of city and interurban lines, now employed, wishes same position with larger property. Best of reference furnished. Box 1266, Elec Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

YOUNG man, six years in executive offices large Eastern street railway and lighting company. Now law clerk legal department. College graduate; member of bar. Can handle legal and claim work. Good assistant to busy executive. Box 1223, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS VACANT

GENERAL Manager or General Superintendent for electric street railway. Transportation experience especially necessary. Box 1311, Elec. Ry. Jour.

ELECTRICIAN wanted who understands Westinghouse H.L. control and automatic air equipment for large interurban company in Middle West. Good position for first class man. Box 1313, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

LARGE interurban company wants first class man experienced in care of automatic air equipment. One who understands Westinghouse H.L. control preferred. Location Middle West. Excellent working and living conditions. If you are qualified write us at once. Box 1312, Elec. Ry. Jour., 1570 Old Colony Bld., Chicago, Ill.

WANTED—Experienced investigator and adjustor to assist Claim Agent on accident work, only those with experience need apply. Good salary and opportunities. Address E. R., Box 2, Station U, N. Y. P. O.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.
If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Davis-Bournonville Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc., The.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device & Mfg. Co.

Alloys, Steel & Iron.
Titanium Alloy Mfg. Co.

Alloys, and Bearing Metals. (See Bearings and Bearing Metals.)

Amusement Devices.
Este Co., The J. D.

Anchors, Guy.
Electric Material Co.
Electric Service Supplies Co.
Holden & White.
Johns-Manville Co., H. W.
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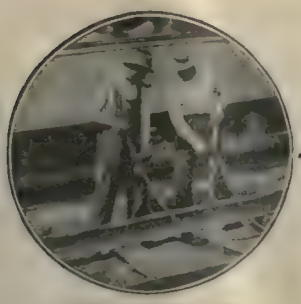
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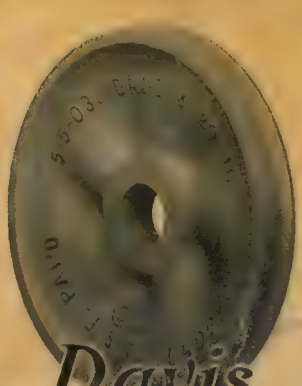
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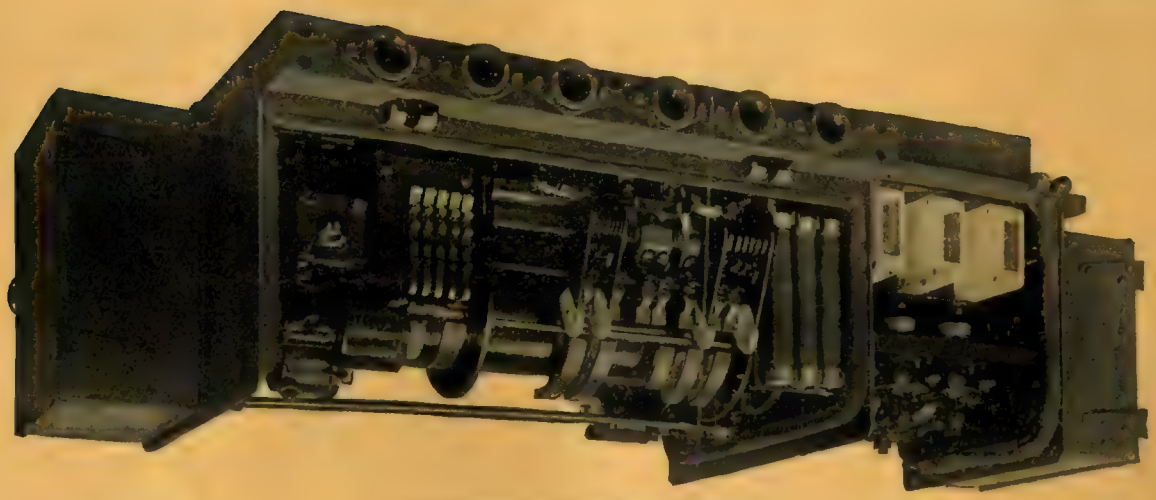
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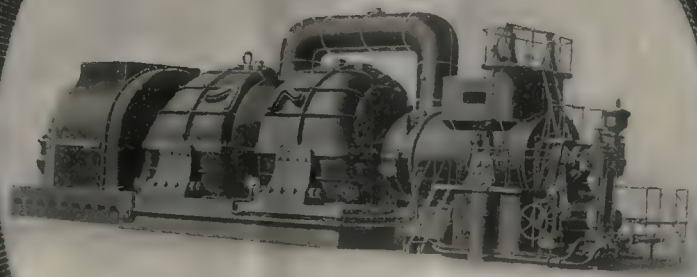
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A Glimpse Into the Future

Westinghouse
Steam Turbines of
45,000 and 70,000 KW.
are now under Construction.



Who dare predict the possibilities of the future?

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

W
WESTINGHOUSE ELECTRIC

Westinghouse





The Westinghouse Inspector-Specialist is a practical railroad man, direct from the car-barn ranks. He knows the air-brake game from A to Z. Moreover, he knows how to impart his knowledge to others, whether it be to the barn-man to procure the best possible conditions of air brake equipment, or to the motorman to guarantee safety and to improve transportation movement.



"It is largely because of the Westinghouse Inspector-Specialist's close co-operation with our men that we are able to handle our cars better than ever before. His work with our barn-men is equally efficient. The majority of our compressors have never been down since first installed eight years ago, and at present rate of going will hang for eight years more." (Recent remark of a Street Railway Manager.)

Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

PITTSBURGH:
Westinghouse Building

CHICAGO:
Railway Exchange Building

TRADE MARK

NEW YORK:
City Investing Building

ST. LOUIS:
Boatmen's Bank Building



O-B Lock Hanger (Pat.)

Every Ear Tight

Unless a trolley ear, when aligned with the wire, fits tightly against the hanger there is vibration with a possibility of stripped threads. That is often what happens with an ordinary hanger.

But with an O-B Lock Hanger there is always a tight joint between hanger and ear.

There is a limited vertical movement of the stud against a heavy lock washer. Both stud and washer are inside a shell which is molded into the insulation. The ear is screwed up until it touches the hanger. Then it is tightened still further, compressing the lock washer, until it aligns with the wire.

Result: tight joint with no chattering or stripping of threads.

There are many types of O-B Hangers for as many conditions. All are insulated with Dirigo composition insulation and metal parts are O-B Sherardized.



O-B Type N Lock Hanger. The joint at "A" is always tight.

Catalog No. 16 lists and describes the complete line of O-B Line Material.

The Ohio Brass Co.

Mansfield, Ohio



Duplex Tri-Colored Signal Lantern



Automatic Double Lens Lantern

Paying Premiums on a Perilous Nuisance

From the standpoint of maintenance Oil Signals on cars are objectionable—a costly nuisance.

But when the all-important question of safety is considered they are positively dangerous. They are easily jarred or blown out and are not always kept in good condition.

Contrast this with the simple, automatic operation of the O-B Electric Car Signal System.

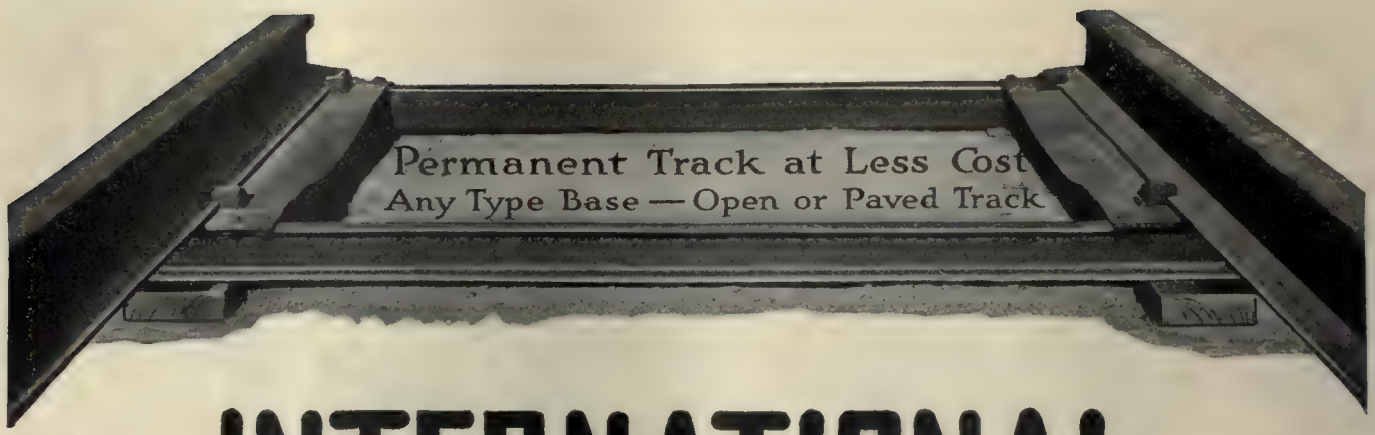
Ordinarily, it is operated on the trolley current, but if this fails, or if the lights grow too dim, or if the circuit is broken for any reason, a storage battery, always charged to capacity, lights a second circuit of lamps in the same lanterns. The car is always well protected.

Also, the O-B System costs little to maintain—much less than Oil Signals.

Send for booklet which describes the operation of the O-B System and gives the actual saving effected over oil.

The Ohio Brass Co.

Mansfield, Ohio



INTERNATIONAL
STEEL TWIN TIES
Cut Rehabilitation Costs

In these days of the diminishing nickel you must build for permanence—track construction must be an investment, not an expense.

You can't afford to tear up your track foundation every time the rails need replacement. You don't have to if you construct with International Steel Twin Ties.

When International Ties are once installed your foundation and tie costs are ended. To replace worn rails simply remove the wedges and clips, replace old rails and put the clip back in place. You needn't worry about the ties and foundation. They're built to last, they stay put, and no man has ever known them to fail.

Permanent construction with International Steel Ties costs less than wood tie construction—$1000 to $8000 per mile less.

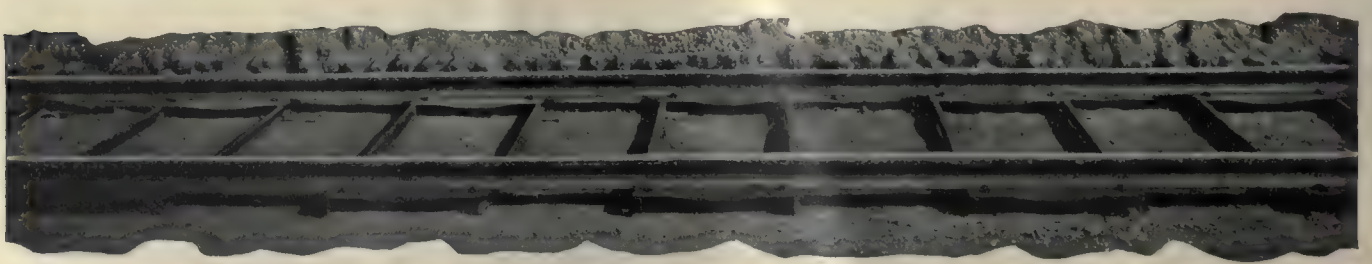
Let us submit comparative estimates on your job.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations
General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal. | San Francisco, Cal. Seattle, Wash. | R. J. Cooper Co., Salt Lake City, Utah. | J. E. Lewis & Co., Dallas, Texas. | Maurice Joy, Philadelphia. | William H. Ziegler, Minneapolis, Minn.



Phono-Electric
Bears the Brunt



Here is one of several hundred spans on the Brooklyn Bridge.

These spans receive the shock of trolley wheels thousands of times a day—

Sometimes from lightly loaded cars traveling at high speeds—

Sometimes from fully-loaded cars traveling at slow speeds but taking heavy currents—*but*

Always on heavy grades.

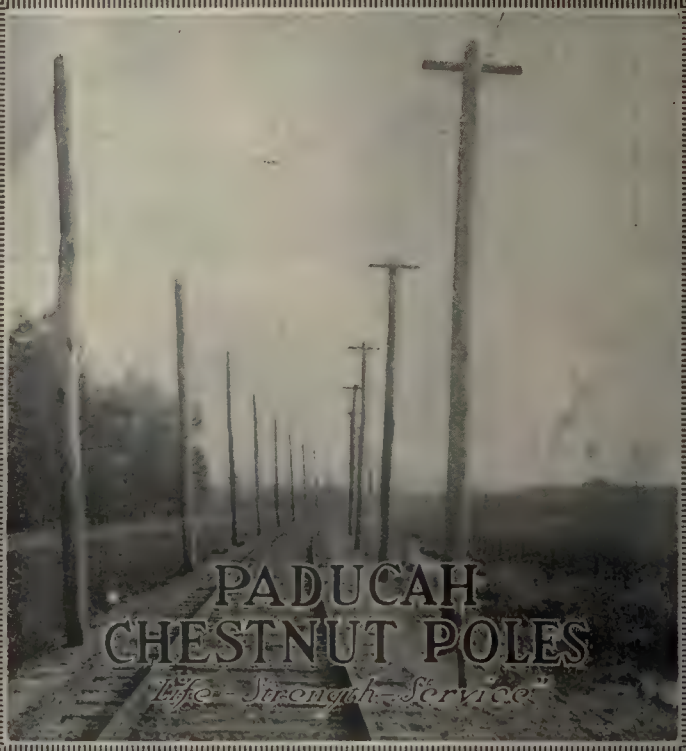
No marvel that Phono-Electric is used in many a span on this famous bridge! Experience of the operating companies proves that it bears the brunt!

Bridgeport Brass Company

Bridgeport Connecticut

Why the Chestnut Pole ?

What Is It?



There are millions of strong, straight chestnut trees in the great forests of America.

But what are they good for?

You never see chestnut furniture or fixtures. You never see chestnut timbers used for bridges or buildings.

Yet chestnut surpasses all other timbers in the one purpose for which Nature intended it.

POLES

Strong, straight, durable, cheap. Neither Nature nor the hand of man ever produced a better pole than chestnut. The added strength is just what your line needs to resist the wind and sleet storms of winter. The inherent rot-resisting qualities make them last longer. They have only ¼-inch sapwood—balance heartwood. Heartwood is conceded the strength of timber. What other wood equals chestnut in this quality?

When you specify chestnut you get the strongest pole that Nature produces. It renders dependable service and dependable service is the best salesman you can employ.

Have you ever gone into this pole problem? Do you know if you're paying too much and getting too little? We can show you if you'll give us the opportunity. All the proof you want for a 2-cent stamp.

PADUCAH POLE & TIMBER CO.

JOHN L. FAY, Sales Mgr.

408 CITY NAT'L BANK BLDG. **PADUCAH, KY.**

Producers of chestnut poles, cypress and long-leaf yellow pine cross-arms, locust pins, oak pins, piling, bridge timbers, red cedar posts and lumber.

Yards, Paducah, Ky.; Metropolis, Ill.; Dividing Ridge, Ky.; Bonnieville, Ky.; Munfordville, Ky., and Mansfield, Tenn.



Automotoneers
Keystone Trolley Catchers and Car Signs in the Heart of Philadelphia

The Philadelphia Rapid Transit Company were the first company to adopt the Automotoneer—the device that keeps the motorman to the predetermined, economical rate of acceleration.

And they are wide awake to the advantages of the curtain car destination signs which we manufacture.

And their use of the Keystone Trolley Catcher for the famous Near-Side car is obvious evidence of its efficiency, because the conductor's position is at the *front* of the car, which means extra responsibility for the trolley catcher.

Have you our catalogs on these specialties?

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.

Anderson Slack Adjusters will not lock the wheels when the load leaves the car

Adjustment governed solely by brake shoe wear

With the Anderson Brake Slack Adjusters no definite amount of slack has to accumulate before the adjuster will compensate for it. No excess slack in the brake rigging is too small to operate the adjuster.

It eliminates the possibility of taking up too much slack simply because the car is heavily loaded and then locking the wheels when the load leaves the car. There is nothing in the adjuster to buckle or clog and no attention is required until the brake shoes wear out.

It is an automatic turnbuckle

The Anderson Slack Adjuster is really an automatic turnbuckle. It operates by means of a cone clutch. It is so simple that there is nothing to get out of order and it does the same work *continually* as is ordinarily done periodically by the man in the pit. It reduces pull-ins, makes every car handle alike, saves power and brake shoes.

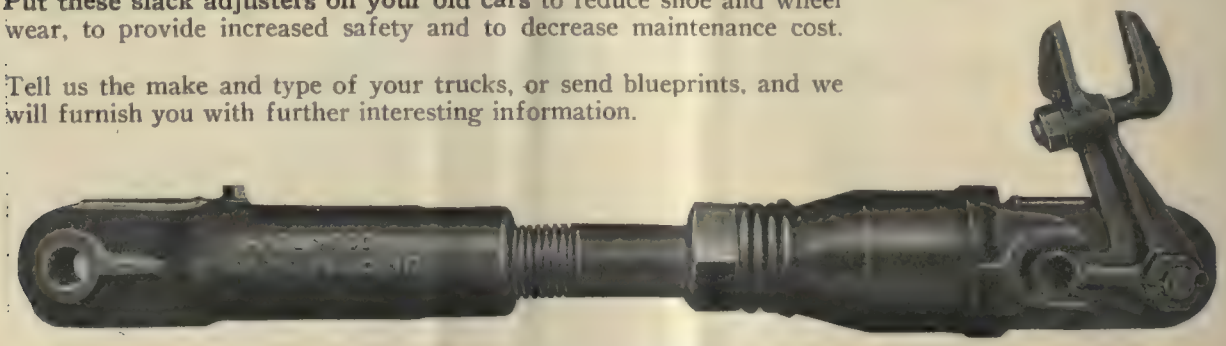
Installed on any car in 15 minutes

The Anderson Adjuster simply takes the place of the usual turnbuckle and can be installed in 15 minutes. It is not necessary to overhaul or change the brake rigging of the car to add this time and money-saver to the car equipment. Once installed no attention is required whatever.

Heat, cold, snow, mud or dirt cannot affect its operation.

Put these slack adjusters on your old cars to reduce shoe and wheel wear, to provide increased safety and to decrease maintenance cost.

Tell us the make and type of your trucks, or send blueprints, and we will furnish you with further interesting information.



Holden & White

General Sales Agents for The Anderson Brake Adjuster Co.

1508 Fisher Building **Chicago, Illinois**



Who Killed Cock Robin?

In other words, who put this water pipe out of business?

Natural rust or electrolytic corrosion?

If your rails are bonded with

ERICO Welded Bonds

you will have no trouble in shifting the responsibility.

And now you can do your bonding better and more conveniently than ever with the

Champion Bonding Truck

The Champion System saves schedules and labor and therefore MONEY.

Write today for details.

The Electric Railway Improvement Co.

Cleveland, Ohio

You May Need a Magnifying Glass to See it—but it's THERE



That insignificant—almost imperceptible—unevenness in the rail ends of a newly laid track joint is the "germ" of a bad joint. And it is a mighty malignant germ and grows rapidly.

The only safe way to "treat" it is to kill it when it's young and the best medicine for that is the use of the

Reciprocating Track Grinder

Here is a specific instance which shows very clearly the reduction of maintenance costs that may be accomplished by the application of the Reciprocating Grinder to new track joints.

Differences in height of rails at joints must be removed immediately to conserve the life of the joint. Practice has demonstrated this very forcibly within the last eight years, and I will mention one particular instance out of many where the issue was brought to my attention. Two pairs of compromise splices were installed of the Atlas type where 70-lb. A. S. C. E. rails were connected to 97-lb. 424 grooved section. At the time of installation in 1913 a very slight difference in the surface of the rails was noticed, and we neglected to grind the rails to a smooth surface. This was a single track over which 26-ton cars operated on from a headway of from three to four minutes. Inside of eight months these joints were a wreck, including paving and rail ends. In order to repair them, new Atlas plates were installed, new pieces of rails were cut in, and the joints were then ground to a true surface. After more than two years these joints are apparently as perfect as on the day they were installed. We find this to be particularly true on compromise joints at special work.

From a report by the track superintendent of a large electric railway.

The disease of corrugations and cupped joints will prove fatal to the long life of track **if neglected.** To check its ravages it should be treated in its early and incipient stages. And the most effective and economical medicine is the application of a Reciprocating Track Grinder which is sold on the basis of "no pay unless you are completely satisfied."

Railway Track-work Co.

30th and Walnut Sts., Philadelphia, U. S. A.

MORE-JONES 'TIGER' BRONZE AXLE *and* ARMATURE BEARINGS



THE severest operating conditions prevailing today can be successfully met with MORE-JONES "TIGER" BRONZE AXLE and ARMATURE BEARINGS.

"TIGER" BRONZE has been specially developed for bearing service. It is distinguished by unusual anti-friction qualities, toughness and density of grain. This insures great strength, a very slow, even rate of wear and minimum friction.

MORE-JONES ARMATURE BABBITT METAL is recognized the world over as standard. Measured by service actually performed, it is the most economical on the market. Composed of entirely new metal—no scrap—contains absolutely no lead and is much lighter than other babbitts. Takes on a high polish and shows perceptibly no wear.

Further information and prices on application.

More-Jones Brass & Metal Co., St. Louis, U.S.A.

MORE-JONES ARMATURE BABBITT METAL

MORE-JONES B & M Co's ST. LOUIS, MO. ARMATURE

Some Applications of

NUTTALL

Railway Products



Here Is the Evidence

These and other important railway properties throughout the world have found by thorough test that Nuttall Railway Products give more and better service and at less cost per mile.

Their experience covers every operating condition and somewhere in all this varied experience is a solution for the problem that may now be troubling you. Let us suggest the proper gear, pinion or trolley for your particular condition and make a test for yourself.

Ask for Catalogues 12 and 13.

Gears **Pinions** **Trolleys**



NUTTALL PITTSBURGH





Denver State House

220 Rico Coasting Recorders

Increased Armature Life 50 per cent

at Denver, Colorado

Denver is 5270 feet above sea level, just 10 feet short of a mile. But it is not one inch short of attaining operating efficiency with every available tool—and one of its most important tools is the Rico Coasting Recorder. On no other Rico Railway have the possibilities of the Rico Coasting Recorder been studied from so many angles as at Denver.

Not only have the Denver Tramways found that the Rico Coasting Recorder saved power and brakeshoes, but also increased armature life 50 per cent. (April 1915), decreased rundown accidents 41 per cent. (April 1915), and, in the words of its electrical engineer,

"Provided a means whereby we can investigate and obtain economy in operation which heretofore would entail the conducting of expensive tests." These benefits would not be possible if the Rico Coasting Recorder did not embody



The True Principle for Measuring Operating Efficiency

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

Why Divide Responsibility?

G-E railway motors are amply guaranteed by the General Electric Company—so are G-E carbon brushes. Where G-E motors are equipped with G-E parts there is no division of responsibility—the General Electric Company stands back of the entire equipment.

Furthermore, buyers of G-E motors get the benefit of the engineering skill of this company in prescribing the proper motor for their individual needs. Why not take advantage of the same skill in the selection of brushes for these motors?

G-E brushes cost less per mile—

They save wear on commutators



General Electric Company

Schenectady, N. Y.

6669

Electric Railway Journal

Published by the McGraw Publishing Company Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLIX NEW YORK, SATURDAY, JANUARY 13, 1917 No. 2

AUTOMATIC SUBSTATIONS IN DES MOINES

We are pleased to be able to give our readers this week some data regarding the equipment of automatic substations now in process of installation in Des Moines, Iowa, on the city and interurban lines. The most striking fact in this case is that a large quantity of low-tension line copper is to be taken down and sold, a highly profitable undertaking with scrap copper at its present price. The significance of the Des Moines situation is that the engineers of the local railways had sufficient confidence in the reliability of this newcomer in the transportation field to proceed upon the basis of calculations to adopt it upon so large a scale. In this case, also, one element favoring the "automatic" was lacking, namely the possibility of making considerable immediate saving in labor cost. It had to justify its adoption upon the basis of low investment cost. Ultimately there will be a labor cost saving also but this will be "velvet" so to speak. In this installation the automatic principle will be applied in two ways. It will be used for the substations considered as units and also for the individual machines. In the first case the substations will come onto the line or go off as may be necessary to maintain proper voltage regulation, and in the second case where more than one rotary is installed the machine capacity will be adjusted to the load requirements so as to maintain high efficiency and prevent overloading. The flexibility of the automatics is indicated here as they are used in conjunction with the manually-operated substations, each type being assigned to the duty which it can best perform.

AUTOMATIC SUBSTATIONS IN GENERAL

It is but about a year and a quarter since we published the first account of an automatic substation equipment in the transportation field, that is on the Elgin & Belvidere Electric Railway, a small property in northeastern Illinois. This installation has since operated with entire satisfaction to the owners. Since then substantial progress has been made, and one manufacturer reports that at the end of 1916 there were twenty automatic electric railway substations under construction or in operation, the latter comprising about one-half of the total. This progress is quoted principally as evidence of the confidence felt in the reliability of the apparatus. The advantages of a scheme like this can be worked out nicely on paper, but after all they are only of academic interest if the element of reliability is lacking. The underlying principle involved here is that of utilizing the high-tension line to the fullest possible extent. With any system on which rotary converters are used it is obvious that the more uniformly these converters are spread over the system the less will be the amount of copper required in the low-tension distribution. However, with manually operated stations, the labor item soon sets a subdivision limit. With the automatics many more substations can be used, for the labor element is inconsiderable, but ultimately a limit is set by the increasingly higher cost per kilowatt of substation equipment, including buildings and sites, as the individual capacities of substations are lower. An economic balance must be struck to determine the proper number of units to be used in any case.

THE TRACTIVE RESISTANCE OF CARS ON CURVES

Last week we directed attention to the recently published description of tests, made under the auspices of the University of Illinois Engineering Experiment Station, on the tractive resistance of a double-truck electric car on curves. The results of the tests furnish data to show that there is a relation between speed and resistance, a fact which while suspected has in general been ignored for lack of definite information. Under these circumstances it has been customary to assume a value for the extra resistance due to track curvature on the basis of weight, degree of curvature and, sometimes, length of wheelbase. For rough calculations one extra pound per ton per degree curvature is a convenient factor, although this value is probably high for the usual conditions under which an electric car rounds curves. It appears from the University of Illinois tests, however, that unless the merest approximation to the force or the power required in rounding curves is desired such an assumption is entirely too crude. For example, from the sample chart printed last week the tractive resistance per ton at 35 m.p.h. on a 5-deg. curve is 10 lb., whereas at 1 lb. per degree curvature it would be 5 lb., or one-half as much. At 10 m.p.h. on an 8½-deg. curve the force is 5 lb., or, say, 30 per cent less than under the 1-lb.-per-ton-per-degree assumption. It may also be of interest to compare the power consumptions in the above cases. At 35 m.p.h. on the 5-deg. curve slightly over 0.9 hp. per ton is required to overcome curve resistance only, while at 10 m.p.h. on the 8½-deg. curve it is 0.133 hp. At 1-lb.-per-ton-per-degree the respective values would be 0.46 hp. and 0.226 hp. It must, of course, be remembered that the University of Illinois tests were made on one car and under somewhat limited track conditions. However, they furnish reference data of value. The components of curve resistance are of a nature to resist rational investigation. We must, therefore, largely depend upon empirical formulas like the one resulting from these tests.

A PRAISEWORTHY VALUATION REPORT

With the science of valuation still in a formative stage, as it is, we are glad to see any work that really tends to clarify the subject. We welcome, therefore, the long-awaited report of the valuation committee of the American Society of Civil Engineers, abstracted elsewhere this week, for it summarizes in a way that should be helpful to utilities the principles that should control the valuation of normal properties. Representing five years of steadfast work, in the course of which the first progress report was almost completely revamped, the present work ought to be of material service in reducing the uncertainties of valuation as now practiced, although in such a rapidly growing science it is necessarily not the last word.

What to our mind is the most admirable feature of the report is its comprehensiveness and fair discrimination. For instance, although it realizes the desirability of a goal of uniformity, it clearly sees that a sharp distinction must be made between what may be done under present laws and what may be done under future legislation and continuous commission control. New properties, old properties under regulation from their inception and old properties not subject to continuous regulation present different problems and demand different treatment along depreciation and other lines. In general, the report testifies to the painstaking efforts of the committee not to sacrifice justice to generalization, and it deserves careful study as an example of sanity in valuation literature.

The report is too voluminous to be discussed here in detail, but some of the noteworthy sections may be mentioned. The committee, for instance, recognizes that the bases for ratemaking, capitalization, taxation and public purchase are not necessarily the same, but that in each case "fair value" should be deduced by making full allowance for the tangible values in the property, however acquired, and also full allowance for intangibles as far as they are applicable to the purpose in mind. In other words, in an appraisal on the original cost or reproduction-cost basis there must first be included the tangible elements with assigned costs based on concrete facts, but the pertinent facts relating to intangible elements should then be developed independently, so that their value may be determined and added to the appraisal.

In regard to the two main indicators of tangible value, original cost and reproduction cost of existing property, it is evident that the committee is inclined to favor the latter, because of the practical impossibility of obtaining a dependable result where the absence of reliable historical data makes necessary a resort to estimates of original cost, as in the case of old properties consisting mainly of long-lived items. We recognize, of course, the difficulty of obtaining an original cost figure when records are poor or unavailable, and to such an extent we agree with the committee. We believe, however, that original cost should be ascertained if possible as one of the elements of "fair value," and we are not at all certain that the resourceful engineer cannot, in the absence of only part of the original cost records, make suitable estimates with as great a degree of dependability as he can establish a proper reproduction cost schedule of the existing property for the application of present prices.

Other important points in the report have to do with land valuation, development expense and going value. Utilities that have seemed to try in various guises to secure what the Minnesota rate decision denied—an additional land value attaching to the property because of its higher use—will probably be disappointed in the finding of the committee on this point, but they should notice that the report is far from going to the extreme desired by some commissions, *i.e.*, striking off all elements except the naked formal value of land. In other words, the committee believes in the full allowance of all real items of cost, including the compulsory feature, severance damages and acquisition expenses. In regard to development expenses, the committee, in classifying these as an unavoidable real cost to be added to the cost of the physical property, has recognized the demand of commissions that such expenses be proved by the presentation of concrete facts, while in making going value a distinct and intangible element the committee has taken a step that should clarify the existing confusion and secure for this item its proper recognition with other elements that are included in the intangible group.

We have mentioned before the realization of the committee that different utilities must be treated differently in valuation matters. The report particularly emphasizes this in depreciation matters. Its analysis is very clear. What it happily calls "decretion" or loss of service life is always present in some degree even in a well-maintained property. Whether the cost of decretion, however, is a deductible quantity or "depreciation of valuation" simply depends on the accounting procedure that has been followed, or should have been followed under regulation. If the heretofore much-criticized replacement method is used, as on railways where renewals are handled as ordinary maintenance and retirements after a time proceed with fair regularity and cause no serious variations in the return, the cost of decretion found to exist at any time should not be deducted from the valuation because the public has not yet paid for the accrued decretion and is still under obligation to pay for it. Where a commission, however, has prescribed an accumulating depreciation fund in order to make provision in advance for the full decretion of property items, the cost of decretion should be deducted in securing the rate base, but this deduction should be offset by the fund found in public service, either as a separate fund or as additions to plant. Complications arise, for instance, when the accounting treatment of depreciation has not been uniform or when regulation has limited earnings so that they have not been sufficient to cover operating expenses, depreciation allowances and a fair return. In the former case the committee positively says that the depreciation of valuation should be equivalent merely to the accu-

mulated contributions of the public for depreciation allowances. In the latter case the committee qualifies its suggestion of the same procedure by saying that the relative importance of depreciation and a fair return is a matter of equity which will have to be decided by the court. This is undoubtedly correct, but when the courts act we hope that utility owners will not be penalized because of the failure of commissions to allow adequate earnings.

PURCHASE AND SALE OF ELECTRICAL ENERGY BY ELECTRIC RAILWAYS

There are few electric railways which are not interested in electrical energy as a commodity to be bought or sold, or both. In many localities energy can be purchased more cheaply than it can be generated, in others it is economical not only to generate electrical energy but to sell it also, at wholesale or retail. The businesses of transportation and electricity supply are constantly becoming more intimately related so that there are many properties which supply both kinds of service. In other cases, railway and lighting properties are united through holding companies. On the properties where all of the energy is consumed locally in transportation and other railway uses the motive power department virtually sells energy to the transportation department. It is highly important, therefore, for every railway management to know exactly what energy is worth locally, and what the profit is, either when buying or selling or producing for home consumption.

At a meeting of the American Institute of Electrical Engineers, held on April 26, L. B. Stillwell stated that in a 50,000-kw. steam plant with a load of 50 per cent load factor the total cost of energy varies from about 0.4 cent per kilowatt-hour with coal at $1 per ton to 0.75 cent with $5 coal. He assumed a unit power plant cost of $63.70 per kilowatt. The Cleveland controversy over the question of the purchase of additional power for the railway from the central station company or from the Municipal plant, which was just settled, has brought out some fundamental facts. The Engineering Association committee on power generation submitted some valuable tables at the Atlantic City convention giving detailed costs for a number of typical plants. Unfortunately these data were printed for private circulation only, but they are available to members of the association. They show annual average operating costs between about 0.3 cent and 0.6 cent per kilowatt-hr. with load factors from 33 per cent to 44 per cent and outputs between 40,000,000 and 130,000,000 kw.-hr. per year.

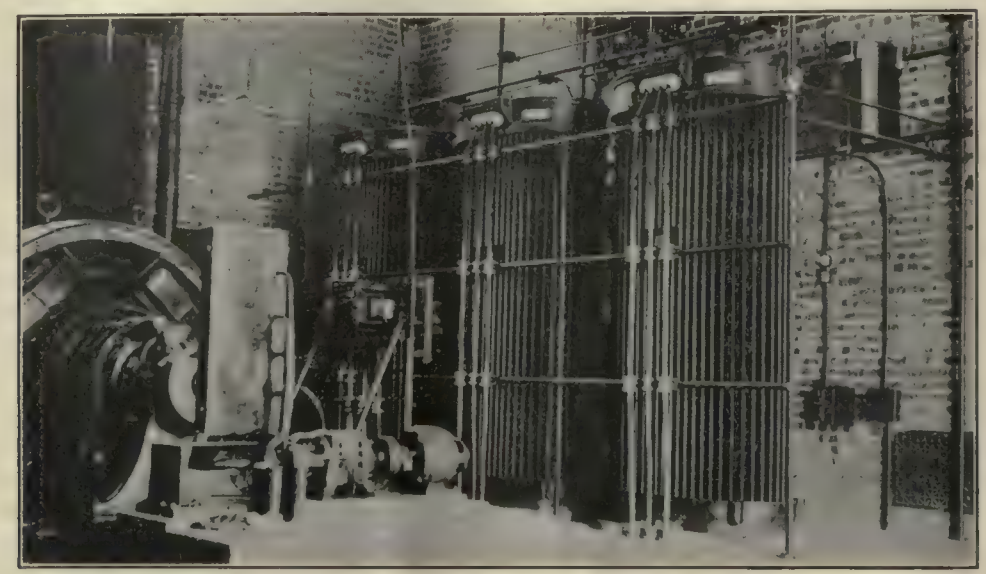
So great is the interest in the subject of energy purchase and sale by railways and so active are the central station companies in going after central station load that the ELECTRIC RAILWAY JOURNAL has found it desirable to investigate the present status of this business with the aid of the *McGraw Electric Railway Directory*. On account of the complicated organization of many companies the results can be stated only approximately, but they will serve as a general guide and as supplementary to the data given in the latest report of the Bureau of the Census. It appears that about 18 per cent of the electric railway companies in this country are doing a supplementary power business and 24 per cent a lighting business. Of the total number 55 per cent generate their own power and 45 per cent purchase power, these classes overlapping to the extent of about 2 per cent. The railways generating power operate roughly 70 per cent of the mileage and 74 per cent of the rolling stock, indicating that in spite of the tendency toward purchasing, to which reference has been made in these columns from time to time and to which the latest census report directs special attention, the railways are still far from going out of the power business. Indeed, many of them are making a good profit by adding to their commercial load.

Whether purchase or sale of power is profitable or not depends so much upon local conditions that no general rule is applicable. The whole matter was summarized in H. G. Stott's New Haven paper, abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for June 24, 1916, page 1170. He pointed out that it comes down ultimately to the question of load factor. That is, the plant which has the most nearly uniform load can, everything else being equal, produce energy most cheaply. It is of minor importance who owns and operates the plant. There is, of course, the related question of reliability, for no railway can afford to risk preventable interruption of power supply. This risk, however, is not as great as it was a few years ago for the perfecting of protective devices has rendered electrical energy supply remarkably continuous.

The most difficult feature of this whole subject is the calculation of the exact cost of electrical energy. The fuel, water, labor and other operating components of cost can be obtained from the records, but the overhead charges must be estimated and thus uncertain elements are brought in. It is customary to assume certain interest and depreciation rates which must porvide for keeping the plant in an assumed "per cent condition." But no prophet can tell what a year will bring forth in the way of technical progress, necessitating the retirement from service of generating units mechanically perfect. Take for example the virtual crowding out of the reciprocating engine by the steam turbine, and in turn that of the vertical turbine by the horizontal. Such a process is expensive but is incident to progress. It is a factor in the cost of power. Fortunately, the unit cost of power plant, *i.e.*, the investment cost per kilowatt, is decreasing. This fact combined with an accompanying load factor improvement accounts for a greatly increased annual output per dollar invested. Investment in plant and depreciation thereof are, therefore, less important than formerly. It should thus be easier as time goes on to calculate the cost of power. The technical association committees which are working along this line should, however, be given every possible facility for their work.

Automatic Substations Permit Large Saving in Des Moines

First Cost of Seven City Substations Under Construction Is $140,000 Less Than the Cost of Manually-Operated Converters and Feeder System for Equal Losses—Present Plan Calls for Ten Automatic Substations, City and Interurban—$90,000 Worth of Copper in Old Feeder System Is to Be Taken Down and Sold



BANK OF TRANSFORMERS, TWELFTH AND HIGH STREETS, AUTOMATIC SUBSTATION, DES MOINES, IOWA

THE first example of the application of the automatic substation to an entire city property is the installation now being made in Des Moines, Iowa. Four automatic substations including one portable substation are now in operation and seven more are under construction or on order.

The principle of the automatic substation is already familiar to the readers of the ELECTRIC RAILWAY JOURNAL through several articles which have been published. It is that variation in line voltage is utilized to control the starting and stopping of rotary converters, and the switching operations. The details of operation of an early installation were presented in the issue of ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915, page 583, where the equipment of the Elgin & Belvidere Electric Railway was described. The equipment as installed at Des Moines is in all essentials identical with that in the earlier installation, except for some refinements in the control apparatus.

TWO PLANS FOR INCREASING LINE CAPACITY

The plan in general includes the complete operation of the lines of the Des Moines City Railway from automatic substations and the supply of power to the Inter-Urban Railway, which is under the same management, at points intermediate to the present substations in order to provide for the very heavy freight traffic and to eliminate the excessive voltage drop. For the present there will be seven automatic rotary converters on the city lines and three on the interurban lines located as shown on the accompanying maps. Plans not yet complete involve two additional machines on the city lines and several more on the interurban lines.

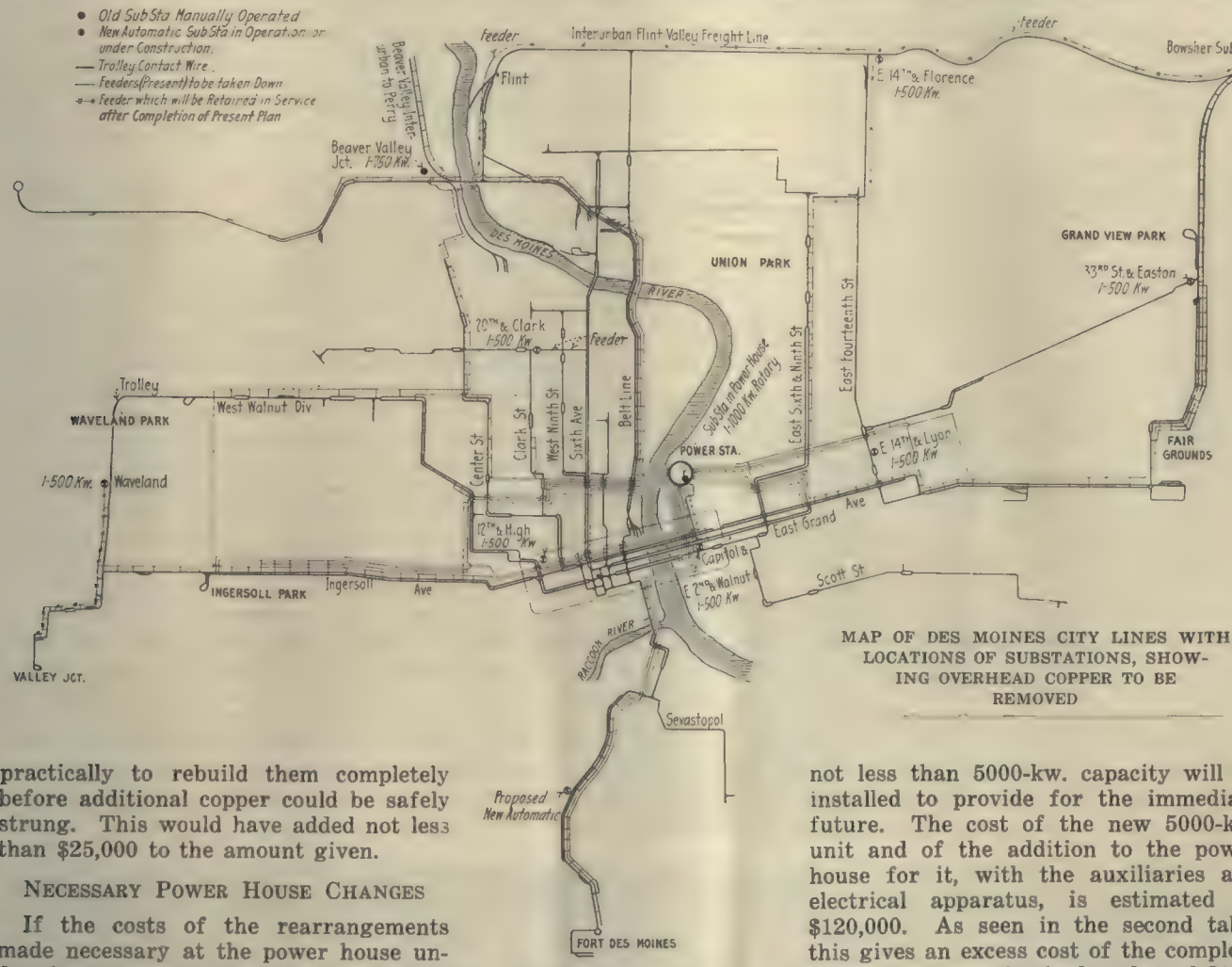
The introduction of the automatic substation in electric railway work came at a time fortunate for the Des Moines properties. The company had been fighting for fifteen years to gain a franchise, in the meantime being hampered in financing new work needed to keep the property up to the greatly increasing transportation needs of the city and surrounding territory. The power loss due to insufficiency of copper in the lines was excessive, so great in certain localities that it was at times barely possible to move the cars. Then upon the granting of a franchise last year forty new four-motor cars were purchased and placed in service, rendering imperative the bettering of the conditions in the direct-current feeder system.

With money available, the first impulse, of course, was to put up more copper. It was estimated, however, that the cost of putting the city feeder system into such a condition that the losses would approximate 10 per cent, would be about $345,000. This estimate was made after an exhaustive study of the conditions, involving the making of many thousand voltage readings at numerous points on the city lines. It included the cost of installing two additional 1000-kw. rotary converters at the power house.

A study of the possibilities of the automatic substation was then made, and it was found that for the city alone an adequate distribution system giving voltage regulation equal to or better than would have been obtained under the previous plan could be installed for $51,500 less first cost. To this could be added the sum of $90,000, the value of the copper which was no longer necessary and could be taken down and sold. The detailed estimates are given in Table I.

Under the latter plan it was, of course, necessary to erect transmission lines to the several new substations,

at a cost estimated at $2000 a mile. The first cost was materially lessened by installing auto-transformers and equipment for doubling the power plant generating voltage to transmit at 4400 volts instead of 2200 volts. The total cost of $345,000 under the first plan is in reality not a fair figure with which to compare the cost of the automatic-substation plan for the condition of the feeder lines is such that it would have been necessary practically to rebuild them completely before additional copper could be safely strung. This would have added not less than $25,000 to the amount given.



MAP OF DES MOINES CITY LINES WITH LOCATIONS OF SUBSTATIONS, SHOWING OVERHEAD COPPER TO BE REMOVED

NECESSARY POWER HOUSE CHANGES

If the costs of the rearrangements made necessary at the power house under the automatic substation plan be included, the total cost is apparently slightly greater than the feeder plan, but this is not really the case, for the following reason: The power house is now equipped with one 2000-kw. and one 1000-kw. turbine units, and two 1000-kw. direct-current reciprocating cross-compound units. With the feeder system taken down, these two direct-current units would be useless, and while they are worth $40,000 in the present plant, they are worth only $5,000 as junk. This $40,000 less the junk value is charged against the substation plan. But before these units and the feeder system can be dispensed with, a new turbo-generator is necessary. While it is essential at the present moment to replace only the equipment to be discarded, which has 2000-kw. capacity, a unit of not less than 5000-kw. capacity will be installed to provide for the immediate future. The cost of the new 5000-kw. unit and of the addition to the power house for it, with the auxiliaries and electrical apparatus, is estimated at $120,000. As seen in the second table this gives an excess cost of the complete automatic substation plan over the feeder plan of $13,300, but increases the station capacity by 3000 kw. and frees the station space previously occupied by the reciprocating units. No provision is made for future growth in the $345,000 feeder plan. Such provision is necessary, as the load is now up to the capacity of the present plant. Estimating at $13,300 the cost of the 3000 kw. of additional capacity, it is secured at a rate of $4.43 per kilowatt. If in the feeder plan $120,000 is added for the cost of a 5000-kw. unit and $25,000 for rebuilding the feeder pole lines, to put the two plans upon a more nearly comparable cost basis, the automatic equipment is seen to be more economical. The complete comparison is given in Table II on page 68.

TABLE I—DETAILED ESTIMATE OF COST OF INSTALLING ADEQUAE DISTRIBUTION SYSTEM

Feeder Plan	
Present feeder copper, at 25 cents per pound	$112,800
Additional copper necessary for proper voltage regulation, at 25 cents	172,500
Two 1000-kw. rotary converters installed in power house, building extension, switchboard, equipment, etc	60,000
	$345,300
Automatic Substation Plan	
Present feeder copper	$112,800
Seven rotary converters and control equipment	98,000
Installation of seven equipments	8,500
Seven substation buildings	21,000
Seventeen miles 4400-volt transmission line	34,000
Miscellaneous material	10,000
Auto transformers for stepping voltage from 2200 to 4400, labor, cable, switching equipment, etc	9,500
	$293,800
Credit feeder copper taken down at 20 cents	90,200
	$203,600
Manually-operated-substations plan, total	$345,300
Automatically-operated-substations plan, total	203,600
Difference	$141,700

PRACTICAL WORKING OUT OF THE PLAN INVOLVING AUTOMATIC SUBSTATIONS

One of the principal features of the automatic substation is the economic possibility of placing stations where the power is needed. In Des Moines practically all cars pass through the downtown "loop" district, indicated on the accompanying map within the light dot-dash line, and the power requirements in this area are consequently very great. In the new plan a substation is placed at either end of the loop. The line losses are cut down so materially thereby that the trolley wire pro-



MAP OF INTERURBAN LINES WITH LOCATIONS OF SUBSTATIONS

vides ample copper and all feeder copper is to be removed. Comparison of the location of these two substations with the former location of the substation nearest to the loop district, the one in the power house, indicates the cause of the saving. Yet the cost of operating a manually-controlled substation placed in the loop would have been greater than the capitalized value of the copper losses involved in supplying direct-current energy from the power house where the station engineer does the operating.

The substation at Twelfth and High Streets is designed for two rotaries which will be arranged so that the second unit will come in on the line only after the load at that point has increased beyond the capacity of the first. One of these units, a 500-kw. machine, is now in operation. A single 500-kw. unit will very shortly be placed in operation at the opposite end of the loop, East Second and Walnut Streets, and the other five automatic stations will be located over the city, as shown in the map, as rapidly as the work can be done. Formerly the entire city lines were supplied from the power house substation, from a few feeders carried back into the city from the Beaver Valley Junction substation on the west division of the interurban, 4.5 miles from the loop, and from the Bowsher substation on the east division of the interurban, 7.4 miles from the loop.

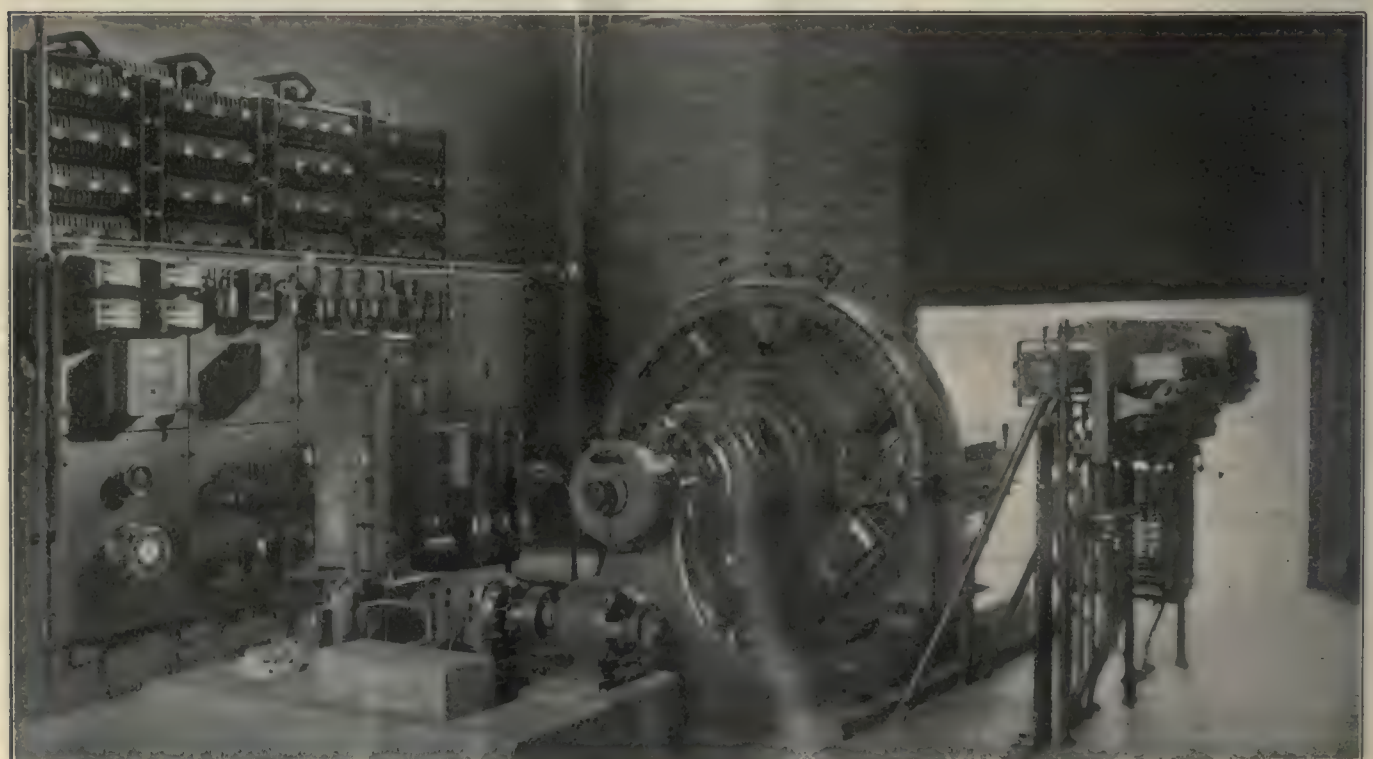
On the Colfax division of the Inter-Urban property

TABLE II—COMPARATIVE COST INCLUDING THE GENERATING STATION CHANGES

Loss due to elimination of two 1000-kw. direct-current reciprocating units	$40,000
Cost of new 5000-kw. turbo-generator installed, extension of station, switchboard equipment, condenser, etc.	120,000
	$160,000
Credit for junk value of two 1000-kw. direct-current units	5,000
	$155,000
Saving with automatic rather than manual plan, outside of station	141,700
Additional cost with gain of 3000 kw. in capacity	$13,300
Cost per kilowatt of 3000 kw. additional station capacity.	$4.43
Cost of feeder plan from previous table, about	$345,000
Cost of rebuilding feeder pole lines	25,000
Cost of adding 5000 kw. turbine to power house	120,000
	$490,000
Cost of complete automatic substation plan ($203,600 plus $155,000)	358,600
Overall first-cost saving in favor of automatic station	$131,400

power is supplied from substations at Bowsher and Mitchellville, which will be retained for the present. An extension of this line to Newton is contemplated, and with its completion a heavy freight traffic is expected which will necessitate a rearrangement of the substations and the use of automatic equipment.

On the west, or Beaver Valley division, of the Inter-Urban property, power was previously supplied by substations at Beaver Valley Junction, Herrold, Moran and Perry, the distances between them being, respectively, 8.7, 11 and 11 miles. Some time ago a gravel pit was opened on the banks of the Des Moines River north of Herrold, and a 2.25-mile spur was built to it to permit the taking of contract for hauling from twenty to forty cars of gravel a day and delivering them to the Chicago, Great Western Railroad at Highland Junction, on the belt line north of the city. Last summer the haul-out of this gravel pit averaged nearly forty cars a day, and this with the other freight haul and the heavy grades and curves on the spur and between Herrold and Beaver Valley Junction caused an excessive drop in voltage. To provide suitable power supply for this profitable carload freight two 300-kw. automatic



CONTROL BOARD, LIMITING RESISTORS, MOTOR-GENERATOR POLARITY REGULATOR, ROTARY CONVERTER AND MACHINE SWITCHES IN TWELFTH AND HIGH STREETS SUBSTATION

substations were installed at Brennan and Hyperion, in the 8.7-mile space between Beaver Valley Junction and Herrold substations. The spacing on the section of line between substations was thus made 3.7 miles from Beaver Valley Junction to Brennan; 2.7 miles from Brennan to Hyperion, and 2.3 miles from Hyperion to Herrold. A 500-kw. portable automatic substation was used all during the summer while the gravel pit was in operation at a mid-point on the 2¼-mile spur, as indicated on the map. This portable substation is completely equipped to be used on either the 23,000-volt line supplying the interurban substations or the 4400-volt lines in the city, it being possible to make the change-over from one to the other in a few hours.

In addition to these three substations on the route of the principal freight traffic, another automatic station is being installed midway between the two interurban divisions on the 6-mile connecting belt line north of the city. This will be equipped with one 500-kw. unit and will greatly improve the operating conditions over this belt line, which has a profile with rather stiff grades for heavy traffic both ways. While the capacity represented by these six substations between the gravel pit and the interchange with the Great Western is more than enough for present requirements, it has been planned for the growth expected in the immediate future. It is expected that the output of the gravel pit will be doubled next summer, and this alone will make considerable traffic over these lines.

At Perry, Moran, Herrold, Bowsher and Mitchellville the day operator also acts as station, ticket and freight agent, handles train orders, etc., and as these other duties require the services of a man anyway, the stations will be continued under manual operation for the present. As the business grows, however, and the combined duties become greater than one man can handle, automatic control equipment will be installed. The situation at Perry has very nearly reached the point where it will be necessary to put on a second day operator, and this station will probably be equipped with automatic control at an early date.

Work is being pushed on the construction of the power house extension and the installation of the new 5000-kw. turbine-generator unit in order to make it possible to take down the present feeder system while the copper market is favorable. The work planned at the power house also includes extensive rearrangements designed to bring the whole station up to a thoroughly modern plant. Good operating economy has been gained in the old plant by utilizing the exhaust from the two cross-compound reciprocating units in a mixed-pressure turbine and balancing the load between the alternating-current and direct-current generators by floating a 1000-kw. rotary converter between the two.

ECONOMIES TO BE REALIZED

The figures given in the early paragraphs of this article do not take into consideration the operating savings resulting from the automatic apparatus. Just what these will amount to is difficult to estimate, but it is certain that the saving resulting from the elimination of light-load losses will be very important. At present no station operators are displaced because of the previous location of the city substation at the power house, where the same number of men must be employed anyway, and on interurban lines because of other duties assigned to the operators. But the absence of the labor cost is distinctly the feature which makes it economically possible to place the automatic stations at the places needed to gain this great saving in copper and the much better voltage conditions than possible by any other plan. The gross savings to be realized must remain largely a matter of conjecture until a period of operation brings out the finite results. When the installation is completed, it is expected that one inspector for the interurban substations and one for the city substations will be all the labor necessary to the operation of all the direct-current supply stations, which will probably eventually number upwards of sixteen stations.

The Des Moines installation was laid out and engineered by F. C. Chambers, mechanical and electrical engineer for the company, and the operation of the substations is directly in charge of C. A. Butcher.

Columbus Railway Impresses Safety-First Move by Night as Well as by Day

A large electric sign mounted on the front of the office building of the Columbus Railway, Power & Light Company blazes forth the warning and the company's interest in the safety-first movement, both night and day. As it is the only illuminated sign on the company's office building, it naturally emphasizes the company's position in safety work. It is very plainly distinguishable from the viaduct on High Street in front of the Union Station, which is at a higher elevation than the downtown section of the street, and is, therefore, one of the first things noticed by the traveler as he leaves the station and looks up the main street. In this manner it has attracted a great deal of attention on the part of the strangers in the city as well as the residents.



ELECTRIC SAFETY-FIRST SIGN ON THE FRONT OF COLUMBUS (OHIO) RAILWAY OFFICE BUILDING

This sign is simply one of the means which the Columbus company has taken to carry on its active work in the interest of safety, and in which it has been unusually successful. The significant features of this work were brought out in a paper read by Harold W. Clapp, general superintendent, before the Central Electric Railway Association recently and published on page 1110 of the Nov. 25, 1916, ELECTRIC RAILWAY JOURNAL.

Consolidation of French Technical Journals

The most important two journals in the electrical field in France, *La Lumière Electrique* and *La Revue Electrique*, have united to form the new *Revue Generale de l'Electricité*. This will be a weekly of about fifty pages each issue, and it will be the official organ of the Union des Syndicats de l'Electricité. The publication will contain four general sections, namely, scientific and technical; industrial; economic and financial, and legislative. The office of publication is 12, Place de Laborde, Paris, and the subscription price in France is 40 francs and in foreign countries 50 francs per annum.

Unit Costs of Construction for Permanent Way

Data Transmitted to Massachusetts Public Service Commission by H. W. Hayes, Engineer of the Commission, Were Gathered from Numerous Sources

IN connection with a report to the Massachusetts Public Service Commission by the engineering department of the board for the purpose of comparing construction cost data submitted by the Bay State Street Railway with similar data from other sources, a large amount of material has been assembled which is of interest to estimators. Selections from these data covering permanent way matters are printed below, only such items being listed as appear useful in general practice. In his letter of transmittal to the board, H. W. Hayes, engineer of the commission, states that the cost data presented were obtained from many sources, notably from the purchase records of the Boston Elevated Railway, the Middlesex & Boston Street Railway, Worcester Consolidated Street Railway and other operating properties; from the Massachusetts Highway Commission, Boston Transit Commission, and from dealers and manufacturers. In the following notes, the source of each unit cost figure is given, so far as possible, and so far as feasible, only recent data are included unless otherwise specified.

The Interstate Commerce Commission's classification has been followed in the items listed.

SPECIAL WORK

I. C. C. Acct. No. 508

All costs except final distribution of crossings, crossovers, curves, frogs, switches, mates and portions of track made to order.

Public Service Commission engineering department estimate of average costs of special work (material only) f.o.b. destination in Massachusetts.

Allow 12 ft. of track for switch and mate: 6 ft. for frog.

1915 Costs, 9-In. Girder Rail	Solid Insert	Heavy Insert	Light Insert
Switch, each	$240 00	$190 00	.....
Mate, each	160 00	120.00	$117.00
Frog, each	160.00	120.00	108.00
Curved track, per foot	3.80	3.80	3.30
Straight track, per foot	3.20	3.20	2.70

For 7-in. or 6-in. girder, deduct 10 per cent from above prices.

Allow 12 ft. of track for switch and mate: 6 ft. for frog.

1915 Costs T-rail work not more than 4.25 in. high.	Heavy Insert	Light Insert
Switch, each	Add 10 per cen	$125.00
Mate, each	to 15 per cent	80.00
Frog, each	.....	70.00
Curved track, per foot	.....	2 50
Straight track, per foot	.....	2.00
Z guard, 4.25-in. T-rail		$0.80 per foot
Bar guard, 4.25-in. T-rail		.50 per foot
Split switch turnout ends, 15-ft. points, all accessories and ground throw, single or double spring frogs, average		120.00 per end
Add for frog guards		7.50 each

RAIL

I. C. C. Acct. No. 507

Average prices paid by Boston Elevated Railway f.o.b. destination per gross ton, drilling included.

	Girder Less Than 100 Lb.	Girder Over 100 Lb.	Guard Over 100 Lb.	T Less Than 6 In.	T 6 In. or Over	Tram	Stringer Guard
1910	$39.88	$35.70	.....	$33.44	$36.00	.....	$45.00
1911	37.91	40.42	$54.96	31.51	36.00	.....	.....
1912	38.62	39 20	54.93	....	39.09	....	....
1913	39.20	39 09	55.88	35.09	.....	.....	....
1914	39.26	39.06	56.05	32.40	.....	$48.16	.....
1915	....	41.27	56.35	.....	39.68	....	....

Mill inspection, 1902-1914, $0.05 per ton.

Bay State Street Railway, record of purchases f.o.b. destination, 1906-1913, 12,991 tons (T) at $30.38.

Adding 35 cents for inspection and warehousing, $30.73.

SPIKES

I. C. C. Acct. No. 507

Price per keg of 200 lb.

	Kegs	Per Keg
Bay State Street Railway average to 11-14	.....	$4.10
Middlesex & Boston, 1899-1914	1,329	4.28
Boston Elevated Railway, 1895-1914	24,611	3.90
Worcester Consolidated, 1902-1915	4,295	3.85
Total and average price	30,295	3 91
Add for warehousing 5 per cent	.....	.19
Total average price per keg	.....	$4.10

GIRDER RAILS

I. C. C. Acct. No. 507

Middlesex & Boston, 1902-1914, 1,583 tons at	$39.09
Boston Elevated Railway, 1902-1914, 22,525 tons at	38.85
Worcester Consolidated and Springfield, 1902-1914, 5,805 tons at	38.82
Average of above, including 35 cents for inspection and warehousing	39.21 per ton

FLAT TIE RODS

I. C. C. Acct. No. 507

Middlesex & Boston, 1902-1914	12,600	at $0.44 each
Worcester Consolidated, 1902-1915	18,063	.37
Boston Elevated Railway, 1894-1914	473,218	.37
Total and average price	503,881	$0.37
Add 5 per cent for warehousing		.02
Total		$0.39

Size and average price range Boston Elevated flat tie rods, 1894-1914:

2¼ in. x 7/16 in.	$0.04
1½ in. x 5/16 in. x 5 ft. 4 in.	.22
2¼ in. x 13/32 in. x 5 ft. 1¼ in.	.34
2¼ in. x 13/32 in. x 5 ft. 3½ in.	.345

ROUND TIE RODS

I. C. C. Acct. No. 507

Boston Elevated Railway 1894-1914, 5/8 in. x 5 ft. 4½ in.	$0.13
Boston Elevated Railway, 1894-1914, 1 in.	0.30

TIE PLATES

I. C. C. Acct. No. 507

Goldie, 175,120 (Boston Elevated), 1894-1914	$0.11 each

RAIL BRACES

I. C. C. Acct. No. 507

60 lb. and 70 lb. Acme, Bay State records 1911, 500 at	$0.14 each
75 lb. Acme, Bay State records, 1911 at	0.165
45-lb. Niagara, Bay State to November, 1914 at	0.10
75-lb. Lebanon, Bay State to November, 1914 at	0.35

CHANNEL JOINTS ON GIRDER RAIL

I. C. C. Acct. No. 507

Feustel—Bay State Street Railway average to November, 1914, including $0.0002 per pound for warehousing and inspection.

	For Sections	Weight		Per Joint
Tram P. S.	No. 200-9-in.	90	22-in. channel; including bolts	$1.57
Tram P. S.	No. 201-9-in.	85	24-in. channel; including bolts	1.68
Girder P. S.	No. 203-9-in.	113	26-in. channel; including bolts	1.80
Girder P. S.	No. 219-9-in.	85	32-in. channel; including bolts	2.29
Guard P. S.	No. 230-9-in.	100	36-in. channel; including bolts	2.53
Guard P. S.	No. 240-9-in.	87	36-in. channel (5/8 in.); including bolts	2.76
Guard girder P. S.	No. 222-8¾-in.	95	22-in. channel; including bolts	1.56
Tram P. S.	No. 223-9¾-in.	96	24-in. channnel; including bolts	1.67
Guard girder P. S.	No. 226-8¾-in.	94	26 in. channel; including bolts	1.79
Guard girder P. S.	No. 229-9¾-in.	84	32-in. channel; including bolts	2.29
Tram P. S.	No. 93-8½-in.	90	36-in. channel; including bolts	2.66
Tram L. S.	No. 206-8¾-in.	96	24-in. channel; including bolts	3.94
Tram L. S.	No. 233-8¾-in.	89	26-in. channel; including bolts	4.18
Tram L. S.	No. 297-8¾-in.	95	32-in. channel; including bolts	4.80
Guard girder L. S.	No. 319-8¾-in.	95	36-in. channel; including bolts	5.3c
Girder P. S.	No. 273-9-in.	125	22-in. channel; including bolts	2.06
Girder P. S.	No. 273A-9-in.	133	32-in. channel; including bolts	3.02
Girder B. E.	No. 6-9-in.	132	36-in. channel; including bolts	3.30
Tram P. S.	No. 400-9-in	104	32-in. channel (1⅛ in.); including bolts, 1912	3.01
Girder P. S.	No. 401-9-in.	104	36-in. channel (1⅛ in.); including bolts, 1912	3.29
Girder L. S	No. 463-9-in.	104	32-in. channel (¾ in.); including bolts, 1913-14	3.05
Girder L. S.	No. 336-9-in.	94	36-in. channel (¾ in.); including bolts, 1913-14	3.35

Boston Elevated average cost of thirteen purchases of channel joints, adding $0.0002 for warehousing and inspection	$0.0202
Worcester Consolidated for eight ¾-in. rail, 26-in. channel, including bolts	1.93
Worcester Consolidated for eight ¾-in. rail, 32-in. channel, including bolts	2.38
Barbour-Stockwell Company 119 lb. 32-in. channel, including bolts, average	3.75
Barbour-Stockwell Company 134 lb. 36-in. channel, including bolts, average	4.15

BOLTED STEP OR COMPROMISE JOINTS

I. C. C. Acct. No. 507

Feustel—Bay State average 1912-1914 including $0.0002 for warehousing and inspection.

	Each
T-rail to T-rail	$3.10
T-rail to girder rail	6 50
Girder rail to girder rail	5.50

Average of five Massachusetts street railways:

T-rail to T-rail (range $2.83-$4.06)	3.27
T-rail to girder rail (range $4.43-$6.78)	6.04
Four railways—Girder rail to girder rail (range $3.86-$6.40)	5.09

FISH PLATES

I. C. C. Acct. No. 507

Feustel—Bay State Street Railway average prices 1912-1914, including $0.0002.

	Per Joint
For 35 lb. T-rail, 24-in. fish plate, with bolts	$0.25
For 40 lb. T-rail, 24-in. fish plate, with bolts	0.29

BONZANO JOINTS

I. C. C. Acct. No. 507

Feustel—Bay State Street Railway average price 1912-1914, including $0.0002 for warehousing and inspection.

For 60-lb. T-rail, 24-in. Bonzano with bolts	$0 90
For 67-lb. T-rail, 24-in. Bonzano with bolts	1.02
For 70-lb. T-rail, 24-in. Bonzano with bolts	1.11
For 75-lb. T-rail, 24-in. Bonzano with bolts	1.27
Boston Elevated Railway, 24-in. for 70-lb. T-rail, 1912	1.50

WELDED JOINTS ON GIRDER RAIL

I. C. C Acct. No. 507

Feustel—Bay State Street Railway average prices to November, 1914, including $0.0002 for warehousing and inspection.

Lorain joints	$5.45
Lorain joints, head-supported	6.45
Thermit	12.00

ANGLE-BAR JOINTS

I. C. C. Acct. No. 507

	Per Lb.
Boston Elevated Railway, weighted average, 5600 joints, without inspection	$0.0194
Boston Elevated Railway, weighted average, 1459 joints, average for T-rail over 60 lb.	0.0215
	Per Joint
Boston Elevated Railway, 24-in. for 45-lb. T-rail	$0.31-$0.48
Worcester Consolidated 24-in. for 70-lb. T-rail, 1915	0.77

CONTINUOUS JOINTS

I. C. C. Acct. No. 507

	Per Joint
Bay State purchases 32-in. contin. girder rail, 1912	$4.75
Bay State purchases 36-in. contin. girder rail, 1913	5.60
Boston Elevated purchases 24-in. contin. for 58-60-lb. T-rail, 1901	1.17
Middlesex & Boston purchases 24-in. contin. for 58-60-lb. T-rail, 1915	1.40
Middlesex & Boston purchases 24 in. contin. for 70-lb. T-rail, 1915	1.52

WEBER JOINTS

I. C. C. Accr. No. 507

Feustel—Bay State Street Railway average to November, 1914, including $0.0032 per pound for warehousing and inspection.

For sections No. 222, etc., 26-in. Weber complete	$3.94
60-lb. T-rail, 24-in. Weber complete	1.55
70-lb. T-rail, 24 in. Weber complete	1.65
75-lb. T-rail, 24-in. Weber complete	1.83

GRADING

I. C. C. Accr. No. 504

Feustel—Bay State Street Railway to November, 1914.

	Per Cubic Yard	
Track trench in city	$0 60	
City line eastern Massachusetts, 11,530 ft. track, by company	.616	
Earth excavation country lines—Feustel-Bay State Street Railway to November, 1914	0.38	
Fifteen Massachusetts railroads, 1907-1914, earth excavation, country	0.423	
Rock excavation Feustel-Bay State Street Railway to November, 1914	1.82	
Rock excavation four Massachusetts railroads, 1907-1914	1.50	
Loose rock excavation, Feustel-Bay State Street Railway	1.00	
Rip Rap—rough, Feustel-Bay State Street Railway	2 00	
Rip Rap carefully placed, Feustel-Bay State Street Railway	1 50	
Dry rubble for retaining walls, Feustel-Bay State Street Railway	5 00	
Rubble masonry for retaining walls, Feustel-Bay State Street Railway	6.50	
Track and side catch basins, 14 in. x 14 in. cover and frame, Feustel B. S.	7 00	each
Track and side catch basins, 15 in. circular cover and frame, Feustel B. S.	7.00	each
Track and side catch basins, 20-in. circular cover and frame, Feustel B. S.	8.00	each
Track and side catch basins, 24-in. x 24-in. cover and frame Feustel B. S.	12.00	each
Track and side catch basins 30 in. x 30-in. cover and frame Feustel B. S.	16.00	each

GRAVEL

C. C. Accr. No. 55d

	Per Cubic Y5
Feustel-Bay State Street Railway to November 1914	$0.60
Boston Elevated 1913-1915, on wharf from sea bed	.50
Worcester Consolidated, 1907-1914, estimated haul 5 miles; including pitcost $0.05	.54
Crushed rock, Boston Elevated, 1915, 16,039 ft. of track	1.40
Crushed rock, Massachusetts Highway Commission, local stone, 292 contracts	1.44
Crushed rock, Massachusetts Highway Commission, trap rock, 447 contracts	2.06

TIES

I. C. C. Accr. No. 506

	Each
Chestnut 6 in. x 8 in. x 8 ft. Bay State, 1910-1914	$0.62
Chestnut, 6 in. x 8 in. x 8 ft. Springfield Street Railway, 1910-1914, 206,351 ties	0.469
Chestnut, 6 in. x 8 in. x 8 ft. Worcester Consolidated, 1910-1914, 397,565 ties	0.465
Chestnut, 6 in. x 8 in. x 7 ft. Boston Elevated, 1909-1913, 127,723 ties	0.612
Treated ties delivered to storage yard:	
Boston Elevated, 6 in. x 8 in. x 8 ft. hard pine, creosoted, sawed, 1915	$0.99

Fares in Annexed Districts

United States Supreme Court Decides It Has Jurisdiction in Detroit Case and That Annexation of Suburban Districts by Municipality Does Not Extend City Fare to Those Districts

A SHORT reference to the decision of the United States Supreme Court, delivered Dec. 11, 1916, in the case of the Detroit United Railway, plaintiff in error against the people of the State of Michigan and also against the city of Detroit, carried up from the Supreme Court of the State of Michigan, was mentioned in the issue of this paper for Dec. 16, page 1271. The full text of the decision, which was delivered by Justice Pitney, is now available. It is upon a matter which is of considerable importance to a number of railway companies, as it involves the right of a city to claim the extension of the city fare of an electric railway in districts annexed to the city subsequent to the agreement between the city and the railway.

The decision first rehearses the history of the case, telling that the Detroit United Railway, which was incorporated in 1900, united under one organization certain lines previously constructed and operated independently in the city and its suburbs under different and distinct franchises. Among these were the Detroit City Railway and the Grand River Street Railway, each in the city of Detroit with a franchise which required the sale at certain hours of eight tickets for 25 cents, and the Grand River Electric Railway in the township of Greenfield without this provision. The Grand River Electric Railway was a different corporation than the Grand River Street Railway. In 1905 and 1907 the city annexed part of Greenfield township and claimed that the low rate of fare mentioned was applicable to all of the lines of the Detroit United Railway within the city, not only as its limits existed in 1889, when the Grand River Street Railway received a franchise to extend its tracks to the city limits, but also to the lines in the territory annexed in 1905 and 1907. In the legislation authorizing this annexation it was stated that the annexed territory should be subject to all the laws of the State applicable to the city and to all the ordinances and regulations of the city, with exceptions not material to this case. The railway company took the case to the State Supreme Court on the ground that these acts were in conflict with Sec. 10 of Art. 1 of the Federal constitution.

The decision delivered by Justice Pitney then discusses the question of jurisdiction in the case. It says that the United States Supreme Court has many times decided that the "contract clause" of the constitution is not intended to cover "such impairments of contract obligations, if any, as may arise by mere judicial decisions in the state courts without action by the legislative authority of the state. But in this case there were state laws passed subsequent to the making of the alleged contracts in question, in the form of the legislation of 1905 and 1907 extending the corporate limits of the city; and it is not correct to say that the decisions of the state court turned upon the mere meaning of these contracts without reference to these subsequent laws." "It is too well settled," the court says later, "to be opened to further debate that where this court is called upon in the exercise of its jurisdiction to decide whether state legislation impairs the obligation of a contract, we are required to determine upon our independent judgment these questions: (1) Was there a contract? (2) If so, what obligation arose from it? and (3) Has that obligation been impaired by subsequent legislation?"

The decision then takes up the question as to whether, by voluntary action of the parties between the making of the suburban grant and the passage of the annexation act, the obligations arising out of these grants had been modified, and holds that they were not. It says: "Defendants in error invoke the established rule that the terms of a municipal grant or franchise should be construed strictly as against the grantees and as favorably to the grantor as its terms permit. The state court deemed the rule to be applicable. It is at least doubtful, however, whether the rule, properly applied to the facts of these cases does not bear altogether in favor of plaintiff in error. For, of course it is not possible to adopt an extensive construction of the obligations imposed upon the city companies by the ordinances without adopting a like construction as to the extent of the franchises thereby conferred upon the companies. And can it be supposed that if either of these companies had claimd the right to lay down tracks and operate railways in the annexed territory by virtue of the ordinances of 1889, they would not have been met with the rule that municipal grants are to be construed strictly against the grantee, and cannot be extended beyond their expressed terms?"

The decision then goes on to say that "if the city lines had been extended into the annexed territory by either of the city railway companies under any authority conferred by or assumed under the ordinances of 1889, a very different question would have been presented. But such is not the case. We find it impossible to regard the purchase of suburban lines, with their rights, privileges and franchises, as being in effect an extension of the city lines, but at the same time an abrogation of an essential part of the rights and privileges appurtenant to the acquired lines. . . . And since the judgments of the Supreme Court of that state (Michigan) gave such an effect to the annexation acts of 1905 and 1907, in conjunction with the ordinances of 1889, as to impair those obligations, the judgments must be reversed."

A short dissenting opinion was presented by Justice Clarke, who added that he was authorized to state that Justice Brandeis concurred in this dissent.

A. S. C. E. Valuation Report Prepared

Work of Five Years Results in Enunciation of Principles Which Should Control Valuation of Normal Public Utilities—Report Should Clarify This Involved Subject

AFTER five years, during which forty-eight joint meetings have been held and a voluminous correspondence aggregating thirteen substantial volumes has been carried on, the special committee of the American Society of Civil Engineers has prepared an exhaustive report as to the principles and methods to be followed in the valuation of normal railroads and other public utilities. The report, which is published in the December *Proceedings* of the society, contains 230 pages, the report proper being preceded by a twelve-page abstract prepared by the committee. This abstract, somewhat condensed, is published below.

The report of the committee is to be presented to the society on Jan. 17, but it is suggested by the committee that the discussion be continued in writing and that the report be finally presented at the next annual convention in June. The report is signed by Frederic P. Stearns, chairman; Leonard Metcalf, secretary, and William G. Raymond, Jonathan P. Snow, Charles S. Churchill, Henry E. Riggs and William J. Wilgus, the last three having been appointed in 1914 to fill vacancies.

Noteworthy Findings

Estimated original cost is not dependable; original topographical conditions but present-day prices and methods should govern in estimating reproduction cost; all real items of cost but no "higher use" value should enter into the reproduction cost of land; only when provision is made in the rate, or should be in the accounting, for an accumulating fund should a depreciation deduction be made for loss of service life, this to be offset by the fund; and development expense and going value are distinct, the one tangible and the other intangible.

Fundamental Principles of Valuation

In the opinion of the committee the principles and methods must be such that when properly applied the result will be fair to all parties affected and of a nature that will attract to the service of the public capital to build new properties and extend old ones.

New Properties—In the valuation of a new property, if the question of a fair return is at stake, the actual investment in the portion devoted to public use, including working capital and development expense, should be taken as the basis for "fair value." If the same property is to be valued for public acquisition, the basis of "fair value" should be the actual cost, including the money value of services and other considerations involved. If the valuation is to be used for capitalization, the result should be attained in the same way as the return base, except that all parts of the property should be included. If for taxation, whether of a new or old property, the result must accord with the laws of the state, or, where not governed by such laws, should be fixed at a sum consistent with the valuation of other property for taxation.

Old Properties Under Continuous Regulation—In the valuation of an old property, operating without competition and from its inception under commission control as to rates and methods of accounting, and assumed to have been entitled to earn sums sufficiently large to provide for all expenses of maintenance, operation and taxation, depreciation allowances and a fair return on the "fair value" of the property, the owner should be compensated in some way for losses sustained during the early years of operation before the property was tuned up and the business developed, either by including in the valuation the sum of the deficiency of earnings in the early years, with interest compounded annually, or by allowing higher rates of return in subsequent years to offset the early deficiency.

Old Properties Not Under Continuous Regulation—In the valuation of an old property which has not been subject to continuous regulation, not only are the foregoing principles important, but there are many cases in which equity calls for the inclusion of not only the sum representing the sacrifice by the owner but also a further positive or negative sum representing valuable property or rights acquired or lost by the owner as a result of time or through the failure of the public or the owner to assert their authority, the courts holding that the present value of the property should be used rather than its cost.

Physical Property Included

The physical property to be included varies in different cases with the use to which the valuation is to be put and the law governing the case.

Used and Unused Property—In cases of rate regulation, only the property considered devoted to public use should be included, embracing that in active use and also that properly and reasonably held in reserve to insure the safety, economy, sufficiency and continuity of service. In valuations for capitalization and public acquisition all the property should be included.

Retired or Discarded Property—Plant units definitely abandoned and not likely again to be used, due to having been worn out in service or by reason of the reconstruction of the property, should be excluded from the valuation and should appear either in a separate schedule of retired or discarded property, or such full statement of the conditions should be made as will definitely fix the status of the units or parts. Temporary works necessarily built in connection with, or required for, the construction of permanent works, or for furnishing service to the public at an earlier date than it could be furnished by the permanent works, should be included in the valuation.

Excessive Size or Capacity—No reduction should be made in the valuation on account of excessive size or capacity, except when the excess is so great as to be clearly unreasonable and is the result of not using proper foresight.

Donated Property—Lands or other property voluntarily donated to a public utility should be included when determining the reproduction cost, on the same basis as land and property otherwise acquired.

Leased Property—In the case of leased property, either the property itself or the lease should be valued, as circumstances may dictate.

Title to Property Not Conclusive.—Structures located on land to which the owner of a public utility has no title should be included in the valuation of the property where the owner has been required by law or necessity to pay their cost, including in this class also property voluntarily donated; and they should be excluded where other public service companies, the public or the users, other than the owner in question, have been required by law or necessity to pay their cost.

Working Capital—It is customary to include under the term "working capital" the amount of cash, materials and supplies provided for use in the plant, but not yet forming a part of it, and other current assets essential for proper maintenance, operation and administration. There should be included an amount of working capital sufficiently large not only to meet the usual requirements but to provide for emergencies.

Securities Owned—Ordinarily, the valuation of property devoted to public use should not include securities owned, or surplus cash not forming a part of working capital, except in instances where such securities and surplus cash are an offset, in whole or in part, for depreciation deducted from the cost of the property.

ORIGINAL COST TO DATE

As defined by the committee, original cost to date is the first cost of the identical property units now in use, including overhead charges.

Difficulties—While much of the difficulty of determining original cost as thus defined in some cases may be removed, especially in the case of short-lived property, it is not feasible to obtain a dependable result where the absence of reliable historic data makes necessary a resort to estimates, as in the case of old properties consisting mainly of long-lived items.

Schedule—Generally it will be found necessary to prepare a schedule in the same way that one would be made for determining the cost of reproduction, many adjustments in the records often being required, even under the most favorable conditions, in order to obtain correct results.

Costs—Unit Costs—When a schedule is necessary, the corresponding costs or unit costs are essential to the completion of the inventory, and where these are unobtainable, as is usually true in the case of property units acquired or created long ago, the ascertainment of the original cost is impossible.

Overhead Charges—Overhead charges are, as a rule, inadequately reflected in the records, and therefore adjustments are required which are largely matters of opinion and speculation, and which, in consequence, make more uncertain the final result, thus often destroying its usefulness.

Development Expense—The expense actually incurred in connection with the tuning up and creation of the business of a property should be included as a part of the original cost to date.

COST OF REPRODUCTION

Estimates of the cost of reproduction should be based on the assumption that the identical property is to be reproduced, rather than a substitute property; that while apparent present-day conditions that would affect the cost of reproducing the property must be considered in any logical estimate, yet history must also be considered to determine what is to be reproduced, the conditions under which it is to be reproduced and how the estimates must be made, and that normal present conditions shall determine the prices and methods for doing the work.

Preliminary Work—The first step in estimating reproduction cost is such a study of the property and its history as will enable the estimator to make a complete list of all items and lay out a proper financial and construction program. The field schedules and inventories should not only be based on complete inspections of the visible physical property, but should also reflect a careful historical search of existing records and other reliable sources of information bearing on items of material or work which entered into or were incidental to actual existing units, special care being exercised to limit the speculative uncertainties as far as possible.

Unit Prices—In determining unit prices a rational sequence of construction should be assumed, and rational assumptions made as to the manner of doing the different parts of the work, whether by company forces or by contract. Unit prices based where possible on the actual cost of doing similar work, in a similar manner, under similar circumstances, should be determined by persons of experience and sound judgment. They should be based on the normal average cost of work for a considerable period—say, five or ten years. In the case of items which are steadily increasing or decreasing in value, the prices adopted should be normal for the time of the valuation. Full consideration should be given to the time allowed for construction, to climatic conditions and to the effect of any other significant conditions or limitations upon the cost of the work.

Reproduction Cost of Land—The determination of the figure to be used should be based in all cases on full consideration of the present normal market value of the area of land acquired and of other recent purchases by the same or other companies of similar lands in the vicinity or in districts of like characteristics; the damage to the remaining land, not required, due to severance and all consequential injuries; the amount and character of the costs of acquisition and overhead charges; enhanced prices due to active demand, and any other real items of cost which would be included in case of purchase. But no allowance should be included for special values coming after the acquisition of the property on account of its new use or on account of a greater earning power under the new use, or for any other hypothetical "value." Estimates should be based on prices and values as of the time of appraisal, be they higher or lower than those prevailing at the time of original acquisition.

Overhead Charges—These charges are a necessary and proper part of cost but are not capable of physical identification after the completion of construction work. They cannot be covered in the estimate of cost of reproduction by the application of specific unit prices; from their nature they attach to the whole or large parts of the property rather than to any particular units. Among such charges are:

(*a*) Cost of promotion.

(*b*) Cost of financing and securing the necessary capital with which to carry out the enterprise.

(*c*) Cost of organization, including the incorporation and organization of the company, securing of franchises, and other like expenditures.

(*d*) Engineering, including the making of the preliminary investigations and plans, plans for the construction of the entire property, the engineering supervision of all construction and other work involved in the development of a property, except such direct supervision as may properly be included in the unit prices of various property units, or as specific charge against some particular schedule or group of units.

(*e*) Administration, including salaries for general officers, agents, accountants, clerks and other assistants not included in the engineering and legal departments, and all administration expenses.

(*f*) Legal expenses, including salaries and expenses

of law officials and costs of litigation which, depending on the character of the property and its location, may be a comparatively minor item or a very large one.

(*g*) Interest during the period of construction.

(*h*) Taxes and insurance during construction.

(*i*) Contingencies.

How Depreciation Should be Handled

With a desire to remove the ambiguity and resulting confusion that has attended the use of the term "depreciation" in connection with valuation, the committee has considered the subject from three standpoints: (1) The cause, *decretion* or loss of service life; (2) the record, *accounting depreciation*, or the money allowance made in bookkeeping to offset accruing loss of service life; and (3) the amount sought, *depreciation of valuation* or *fair depreciation*, the sum which should be deducted from original cost to date or from estimated cost of reproduction new as a step in finding that which the courts have called "fair value."

Decretion or Loss of Service Life—Decretion is the fact of loss of service life of a physical property, property unit or item, regardless of its effect on value or anything else. It may be due to use, inadequacy, obsolescence or accident, either singly or in combination. Although, in a well-maintained property, decretion is always present in some degree, yet in some cases this decretion, converted into loss of value, which loss is hereafter called cost of decretion, should not be considered deductible in finding property value.

Accounting Depreciation.—The fundamentals of the methods of accounting for depreciation are that the owner of a public utility is under obligation to the investors in its securities to maintain the integrity of the investment as a continuing property and to furnish suitable service to the public; that the public is under obligation to the owner to pay a fair price for the service rendered, which should cover all operating expenses, a proper allowance for depreciation and a fair return upon the "fair value" of the property, and that the return to the investor and the rates to the consumer should be kept reasonably stable and uniform from year to year and should be fair.

The four methods that may be used in connection with accounting for depreciation, the replacement method, the straight-line method, the compound-interest method (formerly called by the committee the "equal-annual-payment method"), and the sinking-fund method, yield identical total costs when the whole life of a property unit is considered, and any one of them seeming to be the most convenient may be chosen, provided under the circumstances it is legal, safe and fair.

The replacement method is applicable to short-lived properties or parts of properties made up of a large number of items, the replacement or retirement of which proceeds after a time with fair regularity and causes no troublesome variations in return or service rates. The straight-line method applies to property units having more than a year of service life, which are assumed to depreciate uniformly from the beginning to the end of service life. The compound-interest and sinking-fund methods apply to property units the depreciation of which is assumed to progress at the same rate as a sinking fund grows from an annuity, accumulating at compound interest.

Depreciation of Valuation—Finding the cost of decretion is a step in the determination of depreciation, but whether and to what extent, if at all, the estimate thus found shall be treated as depreciation of valuation may be, and very probably will be, dependent, at least in part, on the methods of accounting for depreciation and the character of regulation that have prevailed.

If by order or sanction of a regulating body, or by long-continued proper custom under no regulation, a property, as for instance a railroad, has been maintained in normal working condition, necessarily less than new in some or all of its parts, by the replacement method, and at any given date is being valued for any public purpose and at that date shows normal condition, all its several parts being in as good condition as could be expected, the accounts showing that those amounts have been expended in renewals that were necessary to keep the property in normal working condition, and the fact appearing that no expenditure reasonably to be expected could put the property in better than the normal condition in which it is found, and that no unusually large expenditure is presently to be necessary for this purpose, then, in spite of the fact that there is an existing decretion in its several parts, there should be found no depreciation of valuation. Under the method of accounting the public has not paid, and could not pay, for the accrued depreciation, and under this condition its accrued obligation to pay should be considered a company asset.

If parts of the property are maintained under the replacement method and part by some proper allowance method, except as noted below, then depreciation of valuation should be found with respect to those parts maintained under the allowance method, but this depreciation of specific physical units will be made good in whole or in part by existing funds or property purchased with allowances, either or both of which will be included in the valuation as they are found.

If in the judgment of the valuing engineer the replacement method may not be used with propriety for a given property, either because not in accordance with law, or because the method is not adapted to the property, then, whether or not the property has been maintained in the past under this method, the valuing engineer should estimate depreciation of valuation in the amount of the cost of the decretion he finds.

When a comparatively new property, other than a railroad, is to be valued, and it has not been under any regulation that has affected its accounting methods, the law as laid down in the Knoxville decision would seem to make it necessary to find depreciation of valuation equal to the cost of decretion found for all items, whether or not maintained by the replacement method. This might sometimes be unjust; the engineer should then report facts with recommendations as to equity.

If the straight-line, compound-interest or sinking-fund method has been used in computing depreciation, and the method of accounting for it has been prescribed by a regulating body or voluntarily followed by a company owner from the beginning, the same theory, as far as it applies to the property in question, should be used for estimating the cost of decretion; and the entire cost so found, lessened by any accumulated depreciation funds, will appear as depreciation of valuation, unless the sinking-fund method of accounting has been used. In the latter case, if the valuation has to do with the reasonableness of the return and the accounting is to go on as before, apparently existing depreciation would not be depreciation of valuation, and therefore would not be deductible; but if the valuation has to do with condemnation or purchase, then, as in other cases, the apparently existing depreciation is depreciation of valuation, and the owner should receive the depreciated value of the physical property and the existing fund.

Methods of accounting in force at the present time which make proper provision for the accruing depreciation should not have full weight if, in previous years during the life of the property units, other methods were in use which did not make provision for such de-

preciation. The amount of depreciation of valuation in such cases should be equivalent to the accumulated contributions of the public for depreciation allowances under the various methods of accounting which have affected the property unit from time to time. The public is still under obligation to make good that part of the loss of service life not yet paid for, and this obligation should be considered as much the property of the company usable to offset accrued depreciation as renewal funds or property actually in existence.

If regulation has not fixed accounting methods, but has limited the earnings, it should be permissible to inquire whether the limited earnings have been sufficient to pay operating expense, depreciation, and fair return. If so, depreciation found should be considered depreciation of valuation to the extent warranted by the accounting methods lawfully or properly followed; if not, a question arises. It is remembered that the duty of the company owner is first to maintain the property "before coming to the question of profit at all," and that it is the duty of the regulating body to see that rates are such as to permit the company owner to earn operating expenses, depreciation and fair return. If the regulating body has made sufficient earnings impossible, is it still the duty of the company owner to maintain the property before paying fair return to its security holders? If it is, depreciation of valuation should be found in the amount of the total cost of decretion or so far as warranted by the accounting methods followed. If not, depreciation found should not be considered depreciation of valuation except to the extent covered by earnings after deducting operating expenses and fair return. This is a matter of equity to be determined by a court.

The valuing engineer should bear in mind that when a company has invested a reasonable sum in a property for public service, it is entitled to, but not guaranteed, a fair return on its investment, so long as the money remains in the property, either as property, funds or accrued public obligation to pay. Therefore, so long as the owner keeps a sum equivalent to the total investment at work for the public, either as property serving the public or funds held in reserve for such property, no policy should be followed in estimating depreciation that will reduce the property to a value less than the investment, or, when using cost of reproduction less depreciation as a basis of "fair value," to a value less than the cost of reproduction of that part of the property estimated to have been created with company funds or acquired by gift or in any way not the result of public contributions to cover depreciation.

APPRECIATION

Appreciation, largely the result of solidification, seasoning and adaptation, represents the improvement in quality and usefulness of certain parts of the physical properties of a railroad or other public-utility property. It results from the lapse of time, from work not specifically charged to capital account, from maintenance, from use, etc., and covers items, not represented either by the quantities or unit prices, that are determined in connection with a valuation. There should be no general setting off of appreciation against depreciation, but appreciation should be determined independently from depreciation. Care must be taken that items of labor and expense included in the estimate may not be duplicated in development expense.

DEVELOPMENT EXPENSE AND INTANGIBLE VALUE

In the production of a normal going property, development expense almost invariably is an unavoidable real cost, and is measured by the difference between the amount which the company is entitled to earn in the early years and the amount which it actually does earn. The portion of this expense incurred in tuning up the property and bringing it to its present state of operating efficiency may be included in the cost of construction, and the remainder may be treated as the cost of acquiring the business.

The intangible value that pertains to a property and should be given due weight in the ascertainment of "fair value" is the difference between the tangible value —that is to say, proper cost including development expense, less depreciation of valuation—and exchange value, in which is reflected existing and potential dependable income and beneficial results. It embraces going value, in which is merged good will, franchise value, efficiency, favorable business arrangements and design; and other elements, such as leases, easements, water rights, traffic and operating agreements, strategic location and advantages, and other privileges.

With reference to intangible value as a whole, the committee takes the ground that, in finding original or reproduction cost, there must be included, first, the tangible elements, which can be separately scheduled with an attached value based on concrete facts, and, second, that pertinent facts bearing upon intangible values should thereafter be developed independently, as an aid in the formation of sound judgment as to their value. Exceptional efficiency should be recognized by courts and commissions when appraising property.

Results of Kansas City Railways Safety Campaign

The excellent work in promoting public observance of safety and attention to the subject by the Kansas City (Mo.) Railways is conceded to have been chiefly responsible for the success of a week's campaign for members by the local Safety Council of Kansas City. C. W. Price, field secretary of the National Safety Council, assisted in the campaign, which netted about thirty new members. The local Safety Council has grown from fifteen to more than sixty members in two months. In nearly every case the firm visited expressed itself as eager to participate in the safety work, and signed the application. In several cases secretaries of central organizations asked for material which they could send to their members with letters urging them to join the national council. An association of business men was addressed each noon, and three of the high schools devoted their weekly program to safety.

Washington Railway Relief Paid $13,000

Nearly $13,000 was paid out in sick and death benefits by the Washington Railway Relief Association during the year ended Sept. 30, the annual statement of the association shows. The organization is composed of about 1200 employees of the Washington Railway & Electric Company, Washington, D. C., who are assessed at the rate of $1 a month. For the past year each member received a refund of $8.77, which made the insurance cost exactly 27 cents a month. The sum of $9,485 was paid out in sick benefits and $3,270 in death benefits, the total showing an increase of $4,404.25 over the amount paid out during the preceding year. Since its organization, sixteen years ago, the association has disbursed more than $100,000 on account of sick benefits and $33,000 on account of death benefits, and now has cash and securities on hand amounting to $100,651.

MID-YEAR MEETING
BOSTON
FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING
BOSTON
FEBRUARY 16, 1917

Motion-Picture Film Showing the Development of Transportation Displayed at Portland Company Section Meeting—Capital Traction Section Celebrates Its First Anniversary—Signals and Heavy Traction Were Discussed at the Connecticut Company Section Meeting

"King of the Rails" Film Shown in Portland

Two hundred persons sat down to supper preliminary to the Dec. 20 meeting of the Cumberland County Power & Light Company section. After a short business session, at which seventeen new members were admitted, the meeting was turned over to the entertainment committee. The section orchestra made its debut, and singing and exhibition dancing also contributed to the success of the evening.

M. R. Griffith of the Boston office of the General Electric Company showed and explained a motion picture film entitled "The King of the Rails." This showed the development of transportation from the early days, leading up to the Chicago, Milwaukee & St. Paul Railway electrification.

First Anniversary Celebration of Section No. 8

On Jan. 11 the Capital Traction Company section celebrated the first anniversary of its founding with an attendance of 130. George E. Hamilton, president of the company, was the principal speaker. Greetings from the Washington Ry. & El. Co. section were presented by President J. T. Moffett. A talented local cartoonist gave a "stunt" chalk talk, and a number of those present furnished good music. A buffet lunch was served at the close.

In congratulating the section upon the completion of a successful year's work Mr. Hamilton said that this effort to bring the men into closer touch, to teach them to look broadly at their work, was one of the best things that had ever come into the life of the company. He repeated some things which he had said a year before, in part as follows:

"I am a believer in the association of men, especially of men engaged in the same or similar work. It gives opportunity for useful discussion, and discussion aids thought, stimulates inquiry and invites criticism. It produces knowledge and concentrates effort. It promotes good fellowship and teaches men the value of coordination in view, effort and direction. It is good for the men and good for the interests they serve. Association develops organization, and organization promotes efficiency; efficiency is power, and power well directed compels success. So I am a believer in and an advocate of this association, and my sympathy and cooperation, personal and official, is with the intent and purpose of this meeting. We serve ourselves when we serve well the company and the public, and the fact that we are a public service corporation should never be forgotten. The least of us can by association and all that association brings take on the strength, that comes with a fuller knowledge and a wider understanding, to meet manfully and well our three-fold duty: to ourselves, to the company and to the public we serve."

Continuing this line of thought Mr. Hamilton said in part:

"An organization of this kind brings us together, makes us all see what each is doing, and gives new impetus to our minds and a firmer and a fuller purpose to every man who is striving to do what is right. It teaches us what a service corporation is; shows us that because we are members of this service corporation we have assumed duties that we cannot lightly consider, duties that will compel us thoughtfully to perform all of the obligations that we assume. It shows us the part that each is playing in the performance of this duty. If we learn our lesson well, if all of us engaged in this common enterprise feel and, feeling, measure up to the obligations that we assume, then indeed are we doing the work of men.

"This close contact teaches us more. It brings into the lives of all of us the spirit of service and teaches us what service is."

January Meeting of Section No. 7

Signals, heavy traction and boosting the company were the topics discussed at the twelfth meeting of the Connecticut Company section held on Jan. 9. The usual dinner was held, with an attendance of 125 members and guests, after which George Pfurr, general line foreman Waterbury division, gave an illustrated talk on "Signal and Dispatching Systems Used on the Waterbury Division." He described the working mechanisms forming parts of these systems.

The next speaker was Nathan B. Stone, president of the publicity club of the Chamber of Commerce of New Haven, who chose for his topic "Lux et Veritas." With this as a basis he explained what the public expects from the street railway, and suggested several ways of boosting the Connecticut Company.

George H. Hill, assistant engineer railway and traction department General Electric Company, Schenectady, N. Y., then spoke on the C. M. & St. P. Railway electrification, using lantern slides and moving picture films.

During the dinner the section orchestra played and two soloists gave vocal numbers.

Western Society of Engineers Elects Officers

At the forty-seventh annual meeting and dinner of the Western Society of Engineers, held in Chicago on Jan. 10, the result of the election of officers was announced as follows: President, H. J. Burt, structural engineer Holabird & Roche, Chicago; first vice-president, D. W. Roper, superintendent street department Commonwealth Edison Company, Chicago; second vice-president, J. N. Hatch, consulting engineer, Chicago; third vice-president, W. W. DeBerard, Western editor *Engineering Record*, Chicago; treasurer, C. R. Dart, bridge engineer Sanitary District of Chicago.

James Keeley, editor and publisher of the Chicago *Herald*, addressed the meeting on the conditions in Europe and what may be expected after the war, and Dean F. E. Turneaure of the University of Wisconsin made some remarks on the relations of the engineering school and the engineering profession.

COMMUNICATIONS

Advertising in Company Publications

[NOTE.—The letters printed below were received in response to an inquiry addressed by the ELECTRIC RAILWAY JOURNAL to three of the companies which publish employees' magazines without advertising of the character criticized editorially in our issue of last week. This inquiry was designed to bring out the reasons for the policy followed by these companies. We shall be pleased to print other comment by our readers on this subject, in which we believe an important and fundamental principle is involved.—EDS.]

UNITED RAILWAYS COMPANY OF ST. LOUIS

ST. LOUIS, MO., Jan. 8, 1917.

To the Editors:

Answering your inquiry as to the policy of the United Railways Company of St. Louis in soliciting advertising for the monthly bulletin which we publish for the information of our employees, I will state that when this publication was first suggested we considered the matter of soliciting advertising to pay for a portion of the cost of the magazine.

We decided against such solicitation for the reason that we felt that any such advertising would be given, not because the advertiser desired it for its publicity value, but because he would regard such solicitation as a demand from the Railways Company which he could not refuse. We do not wish to place ourselves in the position of making such demands, and furthermore, we wished the publication to be entirely independent and not have the editor feel that he was under obligation to any advertising concern.

Our *United Railways Bulletin* is now two years old and has increased in size from twelve to twenty-four pages, with a circulation of about 10,000 once a month, and we have no reason to contemplate a change in our policy. RICHARD MCCULLOCH, President.

VIRGINIA RAILWAY & POWER COMPANY

RICHMOND, VA., Jan. 8, 1917.

To the Editors:

In reply to letter of Jan. 5 on the subject of employees' magazines I desire to say that we are heartily in accord with the views of W. S. Thompson of the Grand Trunk Railway in reference to advertising in company publications.

The whole value of such publications in the street railway business is to establish a live contact between the company and its patrons. To carry advertising we believe would needlessly antagonize private enterprises engaged in the various branches of the advertising business who would resent the intrusion of a new advertising agency entering a "closed field."

If we were to consent to carry advertisements, the easiest way to get such advertising would be to appeal to concerns from whom we purchased supplies. These concerns could expect no benefit whatever from the publicity gained; hence their only motive in complying with the request for such advertising would be to ingratiate themselves into the favor of the company and in the last analysis one cannot escape the conclusion that this would really be a form of graft. For a company publication to recognize this practice is, to our mind, a serious blunder, and we are glad that the question is being so thoroughly discussed through your valuable paper. THOMAS S. WHEELWRIGHT,

President.

NEW YORK MUNICIPAL RAILWAY CORPORATION

BROOKLYN, N. Y., Jan. 8, 1917.

To the Editors:

I have your request for my views on advertising in company publications. The primary question in regard to local advertising, it seems to me, is what one can afford. If a company is able to get out a publication for free distribution, carrying no advertising and using covers and other prominent positions for art work, educational bulletins, etc., it is obvious that such publication will be more attractive and probably will make a more effective appeal than a publication in which advertisements are carried.

An employees' publication, it seems to me, should be a subject of pride among all those who are responsible for it. If its full value as a unifying influence is to be realized every member of an organization from the president down ought to take a personal interest in having just as high a grade of publication as it is possible to produce.

I have examined most of the company publications of this kind that have appeared in recent years, and I think I am justified in saying that this examination gives evidence that the relative degrees of success attained by such publications have depended on the interest taken by all connected with the management of the companies producing them, from the highest officers down, in making them dignified, interesting and typographically attractive.

Every publication, whether it is a company magazine or a daily newspaper, develops a personality. This personality usually becomes that of the persons who produce it and reflects their attitude toward it. The publication is the child of their brains and will be characterized by regard or disregard for truth, by fairness or unfairness, by courage or timidity, by good taste or bad taste, according to the controlling characteristics of those who produce it. It will also reflect the extent of their interest in it when it is once born. If it becomes an untidy child, if it cheapens itself by poor English, vulgarity or other evidences of bad taste, this will mean either that its producers are similarly disposed, or else that they care little about it and have abandoned its bringing up to some person or persons who reflect these characteristics.

If I am correct in the foregoing analogy, it is evident that no pains should be spared in producing the best possible type of company publication, for whatever influence it may exert must necessarily be for the development in its readers of the qualities which it thus embodies.

However, to return to our analogy, a family does not cease to be respectable if, through limitations of income, some of its members are called upon to earn money. Plainly the propriety of such a situation depends upon the character of the work done. The head of a household who would allow his children to perform manual labor beyond their strength, or who would allow his neighbors to give them employment in nominal tasks in which they could render no real service, would obviously increase the family income at a sacrifice of self-respect. No one, however, would criticise a boy who performed suitable work, giving fair value for what he earned, either for the purpose of helping out the pocketbook of a family in straitened circumstances or for the purpose of securing spending money over and above what his father could allow him.

The situation is the same with company publications. While the feeling of pride which should be taken in the attractiveness of a publication would naturally disincline a company, that could afford to produce one without advertising, to enter the advertising

field, nevertheless I see no objection, involving manners or morals, to the acceptance of proper advertising where this is necessary in order that the publication may be produced, or where it affords the additional income necessary to make the publication thoroughly attractive. Any publication which circulates among several hundred or several thousand employees, in a given city or in various cities which may be centers of industry has, of course, a definite value for certain classes of advertisements. A publication whose circulation is confined to one city only ought to be a very desirable medium for local stores, theaters and all other classes of strictly home advertisers, because if its standards of excellence justifies continued existence, it is bound to be read from cover to cover by its clientele. This sort of reading creates an element of advertising value quite distinct from the size of the circulation and enables certain well-known periodicals with very limited circulation to command the highest rates paid by advertisers in their respective fields.

A publication issued in several different industrial centers where any large company may have plants ought in any event to have certain pages devoted to local news in each plant which would, in the interest of economy, make it desirable to have separate editions. Each such edition, however, could develop its own advertising along local lines, if for any of the reasons indicated above it is necessary to carry advertising.

I do not think it necessary to characterize the impression which would be made on any intelligent person by a company publication which solicited or accepted advertisements from concerns from which it was purchasing supplies or to which it sold its product. If such supplies were required by its employees the company would do better to arrange to obtain them on the lowest possible terms through its own purchasing machinery, which would not require advertising on the part of the dealers. If its own product is one which its employees have occasion to purchase, then the company had better sell to them direct on the most reasonable basis possible.

I do not recall any instances of company publications that have come to my attention which have offended the proprieties in this way, and I add this to my discussion only that it may cover fully the conditions to which it is addressed.

HARRY A. BULLOCK,
Secretary.

Spacing of Subway Stations

Massachusetts Commission Points Out That Interests of Greatest Number of People Must Be Considered

IN a hearing held recently by the Massachusetts Public Service Commission on a petition for another subway station in Cambridge, brought by some citizens of that city, the commission discusses the general subject of the proper spacing of stations and the principles which should govern. It said that it would consider this question on its merits without admitting the power of the commission to compel the company to construct a station at the point suggested, if that should prove desirable.

The proposed location is about half-way between two existing stations which are about a mile apart. The petitioners pointed out that on other subways and rapid transit lines, both in Boston and other cities, notably New York, the stations are usually located at intervals of about a half mile, but the commission declares that the conditions affecting station location in the business districts of Boston are so different from those which exist in the suburban districts served by the Cambridge subway as not to be properly comparable. In New York, the commission says, the conditions are also so different as to make a comparison of even less value, as local and express service is conducted in the same subway, and the average distance between the express stops from Brooklyn Bridge north is about 1.66 miles.

The petitioners further stated that the installation of the new station would largely increase property values in the vicinity and prove of great economic value to the city, but the commission held that for it to stimulate artificially real estate development in Cambridge at the expense of similar development in other communities would be an arbitrary and unwarranted exercise of authority. It also pointed out that the saving in time to those who would use such a station would be more than overbalanced by the loss of time by others living farther out who would be delayed by the station stop. the company had testified it would cost $60,646 a year to operate the station, and its installation would be an entering wedge which would tend to decrease the value of the subway as a rapid transit line serving more distant suburbs as well as Cambridge. The petition was, therefore, dismissed.

Canadian Compulsory Investigation Act

Adoption of Principle in This Country Would Grievously Disappoint Even Its Most Ardent Advocates

IN view of the present administrative program for adopting in this country the principle of the Canadian compulsory investigation act, Ralph M. Easley, chairman executive council National Civic Federation, New York, has issued a statement regarding what he deems to be the unsuccessful workings of the Canadian act and the impropriety and uselessness of passing a similar act for the United States. This act was described in the ELECTRIC RAILWAY JOURNAL of Nov. 25, 1916, page 1107. According to Mr. Easley the official reports of the Board of Conciliation to the Labor Department of Canada on the operation of the act from its passage in 1907 to 1916 furnish enough information to dissipate all belief that an industrial Utopia has been developed in Canada.

In the whole nine years the Canadian act dealt with disputes involving only 146,000 employees, and 32,000 of them, or nearly 22 per cent, struck in spite of the award, and in many cases in spite of the law itself before making an application for an investigation. Nothing in the record shows that any attempt was made to inflict the penalties of the law by fining them or sending them to jail. The Canadian act, it is asserted, was not intended to prohibit strikes and it does not prevent them. It is intended only to delay them until after a board has heard both sides of the issue and made a public recommendation, after which either side or both sides, as has happened in Canada again and again, can go ahead and fight it out.

Mr. Easley believes that the adoption of the principle of the Canadian act in this country would not only grievously disappoint the hopes of its advocates, but would tend to make of wage-earners here a horde of lawbreakers. The issue cannot be met by any form of compulsory legislation. Some sort of a mediation board, named by the President and mutually agreed upon by the railroad managers and the brotherhood leaders, under federal supervision, would help the present railroad situation. It would not absolutely prevent a recurrence of the crucial situation of last autumn, but in Mr. Easley's opinion there is no scheme which would be an absolute preventive.

Short and Up-to-Date Articles on

EQUIPMENT AND ITS MAINTENANCE

Remodeling Motors on Third Avenue Railway System—Prolonging Life of Rails in Connecticut—Protecting Roadbed on Water-Retaining Soils on B. R. T. System—Automatic Car and Air Coupler—Spring Type Post Casing for Car Windows—Contact Signal for Cleveland & Eastern Traction Company

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

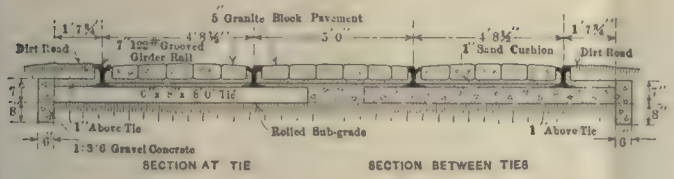
Concrete Baffle Walls in Protection of Roadbed for Water-Retaining Soils

The Plan of Keeping the Water Out Rather Than Draining It Away Was Preferred in the Case Cited

BY R. C. CRAM
Assistant Engineer Way & Structure Department, Brooklyn Rapid Transit System

During an investigation of soil conditions precedent to the construction of the Eighth Avenue extension from Thirty-ninth Street to Bay Ridge Avenue, Brooklyn, it was found that a soil of a character likely to retain considerable water would have to serve as the roadbed for the new tracks. A rather unusual condition was thus presented, as most of the soils found in Brooklyn are gravel and sand, or sandy loam, retaining little water, and these have been found generally suitable for sub-grade foundation without resort to special drainage or the use of concrete platforms or ballast under the ties. The necessity of some method of drainage therefore became evident.

The need for keeping water-retaining subsoil dry was recognized, particularly as no protecting pavement was to be installed in the adjacent roadways



CONCRETE BAFFLE WALLS FOR PROTECTION OF SUB-GRADE IN HEAVY SOIL

which would conduct the surface water away from tracks, but instead of installing a subsoil drainage system it was decided to construct small concrete baffle walls at the outer edges of the concrete base necessary for the granite track pavement. They were constructed as a part of the paving base and the small trenches required to form the walls were made in the soil shortly before the installation of the concrete so as to avoid the necessity for using the usual forms.

A glance at the accompanying cross-section will show that the adjacent roadway surface must become thoroughly saturated with water to a depth of over 21 in. before the moisture can pass to the subsoil directly under the tracks. It is believed that it is practically impossible for this to occur and that the subsoil will be kept dry. As dry clay soils of the character found will sustain any load which can be placed on it by means of street railway tracks, the tracks should remain in good surface until the city can pave the adjacent roadway, which may not be done for a period of several years.

A Large Job of Motor Remodeling

An Eastern Railway System Has Been Able to Reduce Maintenance Costs on Old Motors to a Reasonable Value

BY R. H. PARSONS
Electrical Foreman

When the present management of the Third Avenue System of New York took charge about ten years ago the road was equipped with some 600 Westinghouse No. 56 motors. These motors had previously been a source of continual trouble, especially on account of hot bearings. Flashovers and grounded armatures, fields and brushholders were also common. At this time the motors were overhauled and the car wiring repaired. Whereas grease had been used as a lubricant previously oil lubrication was tried. Men were stationed at the ends of the line to oil on each trip, and the motors were also oiled nightly.

The motors then gave fairly satisfactory service until

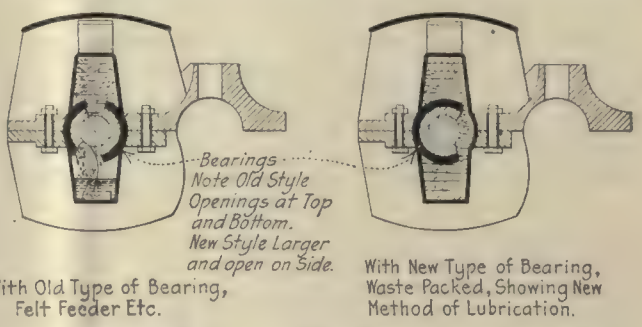
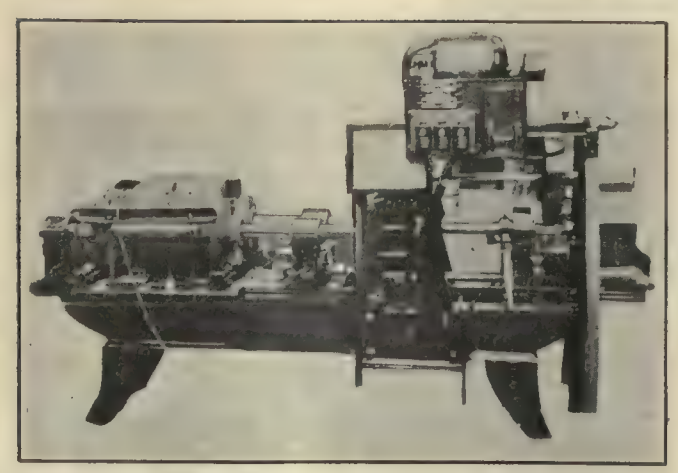


DIAGRAM SHOWING OLD BEARING BEFORE AND AFTER REBUILDING

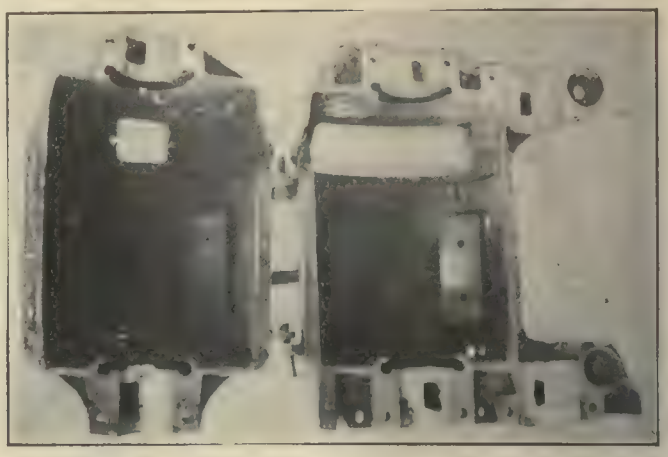
about a year later, when they were placed on fast runs. Here they again developed hot bearings. An attempt was then made to convert them from the split-frame type to the box type by electric welding, using frameheads of modern motors. This was very successful, except that the cost was excessive, about $75 per motor. Finally the old bearings were rebuilt along modern lines, as described below, and this completely remedied the trouble.

In the old bearings lubrication was accomplished by means of a felt feeder, which conducted oil from the bottom of the bearing shell onto the shaft, as shown in an accompanying diagram. The glazing of this felt, together with the leakage of oil, was the cause of poor lubrication. In the new style of bearing lubrication is effected by the use of a roll of oily waste which is packed above and below the bearing, passing around the shaft, as shown in a second diagram.

In changing the bearings the first operation was to burn out the old bridging through which the felt feeder was led. A view of the shells with this piece burned out is given in an illustration on page 80. Then a



OLD PLANER USED FOR BORING BEARINGS ON REBUILT MOTORS



VIEW OF FRAME SHOWING REBORED BEARINGS

curved piece of ½-in. steel was electrically welded in place of the old bridging, as shown. This piece instead of having a hole in its center had the hole on the end, and in the upper shell a hole was left in such a position as to fit directly over this lower hole. The large bearing which fits over the wheel shaft was also built up where it had worn. Both bearings were then rebored to their original dimensions, as shown in another illustration.

For reboring, a discarded planer was pressed into service. The motor was fastened to supports which rested on the sliding bed of the planer. Both bearings were bored at the same time by two boring bars, which were geared to a motor on top of the planer. These bars were held securely and guided correctly by two heavy pillar blocks which were doweled and bolted to the frame of the planer.

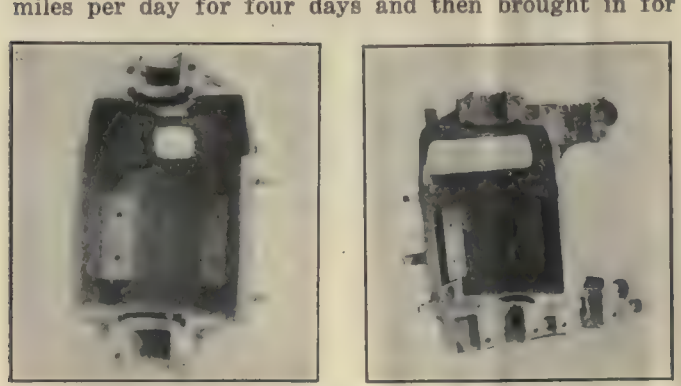
Cast-steel bearings were used in the remodeled motors on account of their long life and the ease with which they could be tinned to keep the babbitt tight. New babbitt blocks were put in, the axle lugs were reinforced and the covers were fitted with modern fastenings. The cost of the whole operation is shown below:

Welding	$6
Boring	5
Reassembling	6
Material, bearings, etc.	8
Total	$25

While this work was being done, the fields and armatures were tested and repaired. The armatures were rebanded and the commutators were tightened and slotted.

The advantages derived from this change are apparent in the following records: One car was run 280 miles per day for four days and then brought in for inspection and oiling, using 1 gill of oil for each box. The car continued in this service until it had made a mileage of 45,000, and then, for reasons other than motor trouble, it was put in lighter service. It remained in this service for 15,000 additional miles, after which the motors were still in good condition.

On another division, where the cost of lubrication had been high, after fifty out of sixty-five cars had been equipped with the remodeled motors, the cost was reduced exactly one-half. The remodeled motors are now put into the same service and given the same attention as the modern motors. The bearings do not have the life of modern ones, but where the old bearings needed overhauling after 10,000 miles, the remodeled bearings easily make 50,000 miles with oiling at regular inspection periods instead of daily.



VIEWS OF FRAME AFTER OLD BEARINGS WERE CUT AWAY AND AFTER NEW PIECES WERE WELDED IN PLACE

Prolonging the Life of Old Rail*

Experience of Connecticut Company Shows that Rail Need Not Always Be Relaid When Permanent Paving Is Installed

BY M. E. STARK

Superintendent of Track Connecticut Company, Bridgeport, Conn.

The Connecticut Company has been called upon by city and state highway officials to pave many miles of its track with so-called permanent pavement. In complying with these requests it was at first considered necessary to renew the rails which in many cases had not reached a condition where renewal would be considered necessary under ordinary conditions. It was possible in many cases, however, to prolong the life of the old rail by the use of grinding machines, special joints and welding equipment. Brief descriptions follow of methods employed in typical jobs where the track was rebuilt at the time the pavement was constructed. Figures are given to show the saving that has resulted.

Job A—The track construction on this job was 7-in., 70-lb., T-rail in 30-ft. lengths with ordinary joints. The joints were badly hammered, and corrugations had started in many places. The general surface and alignment of the track were also very poor. In rebuilding the track the joints were repaired with welding and grinding machines, Abbott joint-plates were placed under every joint, iron shims were placed under the rail on every tie and the track was paved with Hassam pavement. This job covered about 8000 ft. of double track, and by leaving the old rail in the new pavement a saving of the expenditure of nearly $20,000 was made.

Job B—This section comprised 6678 ft. of double

*Abstract of paper read at American Electric Railway Association Company Section Meeting, Dec. 14, 1916.

track and 425 ft. of single track. The rail, which was 7-in., 70-lb. section was electrically welded. New ties were installed throughout, new rails were cut in where some of the welded joints had broken down and some joints that were badly cupped were built up with the aid of the Indianapolis welding machine. The excess welding steel was ground down with the Seymour rotary grinder and finished with the reciprocating grinder, and a few places where corrugations had started were smoothed up. The track was then paved with Hassam pavement. All of the labor for track work on this line, including the preparing of the sub-grade before paving, cost 67 cents per foot of single track. The figures show that on this job alone by leaving the old rail in the new pavement a saving in the expenditure of about $16,575 was made.

Job C—This track was laid with 4¼-in. second-hand steam road rail in 30-ft. lengths, weighing about 50 lb. per yard. About half the track was located on the side and half in the center of the street. New ties, new joint plates and Abbott joints were installed and the track was back-filled with gravel. The length of single track repaired on this job was 4500 ft. and a saving in the expenditure of $3,010 was made. On a similar section comprising 3520 ft. of single track, a large portion of the old rail was left in and by prolonging the life of the old rail a saving of the expenditure of $6,325 was made.

Job D—On this job the old 7-in., 70-lb., T-rail was left in, being given the same treatment as outlined above. This covered a distance of 400 ft. of double track, the saving in this case being about $1,000.

On another job involving two tracks, one of which was in good condition, striking results were obtained. The south-bound track was of 7-in., 70-lb., T-rail somewhat cupped at the joints and with slight corrugations in places. The joints were not electrically welded. The north-bound track was of 9-in. girder rail worn beyond redemption, and this was replaced with 7-in., 95-lb., T-rail with continuous joints. When the work of putting the south-bound track in repair so as to save the old rail was under way the company put the Indianapolis welder at work and filled up all the cups at the joints, ground off the excess steel with the Seymour grinder and polished the joints down with the reciprocating grinder. All corrugations and rough places were smoothed off and now that the job is completed very few people riding over this track could say which of the two tracks rides the smoother.

It was the rule on all of these jobs that cars should not pass over the track being paved until the last section of pavement laid had been in place at least twenty-four hours, but occasionally it was necessary to let the cars run over small stretches of the track, while the pavement was being installed. In all of the jobs mentioned a good riding track has been obtained, the rail of which is embedded in a solid mass of concrete which extends 5 in. below the base of the rail. It is believed that with minor repairs with the grinding and welding machines the track will give entire satisfaction for many years to come.

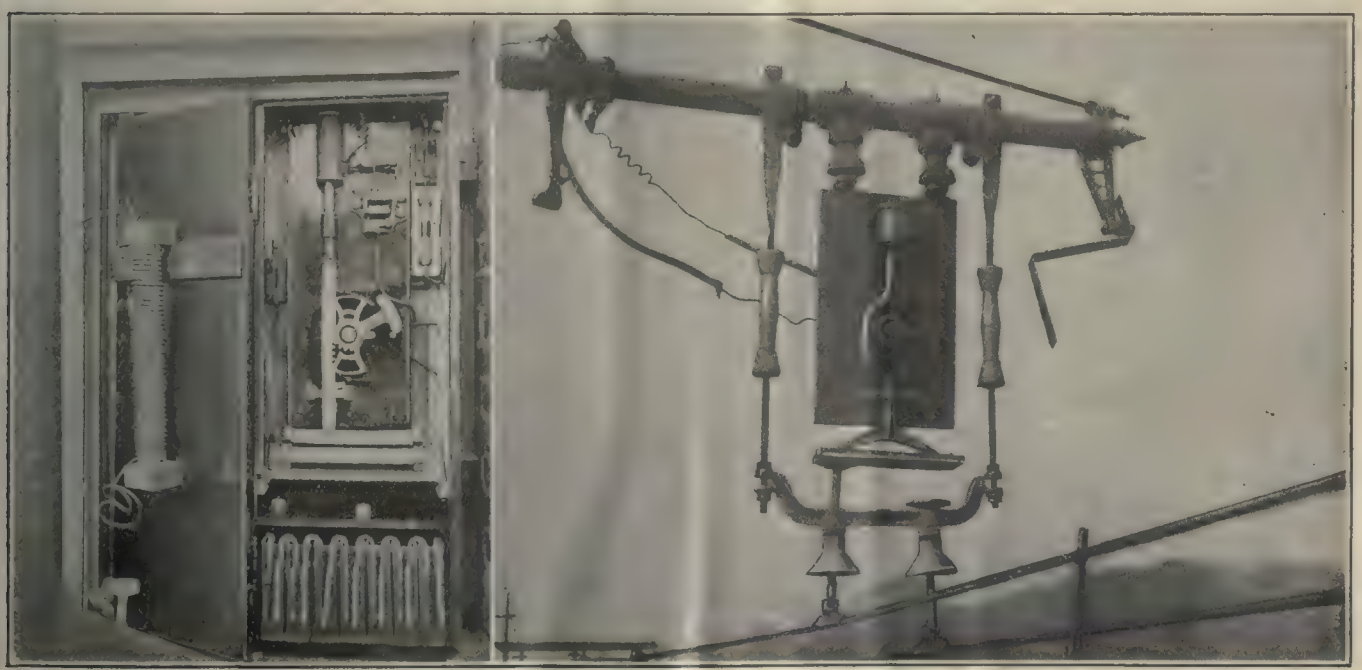
New Type of Contact Signal

A Simple Hand or Automatic Signal Operating Satisfactorily on Cleveland & Eastern

A new design of block and crossing signal has been in practical operation on the lines of the Cleveland & Eastern Traction Company for more than two years. Its construction and operation are very simple, and, therefore, no skilled workmen are required to keep it in working condition. It may be operated either from track or from trolley, a two-way switch that forms the most important element being operable either electrically by a solenoid or by mechanical pressure from the trolley poles of passing cars.

The apparatus, when operated from a rail contact for block signal purposes, consists of a switch mounted on a line pole at each end of the block, a circuit of lights connected in series between the two switches and two 30-ft. insulated sections in one rail. The circuit through the relay is completed through the other rail. The switch mechanism consists of the above mentioned relay, a solenoid which operates the switch that controls the 500-volt light circuit, and a seven-cell storage battery. This battery floats on the line continually and supplies the energy to the solenoid.

The operation of the switch is as follows: The block is protected at each end by a lantern with red lenses,



MECHANICAL TROLLEY-CONTACT SWITCH WITH HOUSING REMOVED, AND RAIL-CONTACT TYPE OF SWITCH OPERATED ELECTRICALLY

and if this lantern is illumined, indicating danger, the car is compelled to remain beyond the block until the lantern is extinguished, indicating that the block is clear.

When the signal is not set at danger, the car travels beyond the first lantern to the insulated rail, at which point the motorman receives a come-on signal by a white light. He then proceeds for about one-half the length of the block, at which point a double caution light is seen. He then proceeds through the block, and at the far end the car makes contact with another insulated length of rail, clearing all of the signals in this block for the next car or train.

The above-mentioned middle or caution light is for any irregularities, such as if another car had entered the block through the carelessness of the operator in not having observed the signal. In this case, the opposing car would immediately note that this signal was dark and would thereupon stop at once, flagging through the balance of the block.

In the operation of the same apparatus as a crossing signal, it is necessary only to use one switch with a wire running to each insulated rail. In this combination is used a set of five lights in conjunction with a bell. One each of this group of lights is located approximately 700 ft. on either side of the crossing, the remaining cluster of three lights being located at the crossing to serve as a visual indication.

The light circuit and the bell circuit are separate, so that neither one is dependent upon the other for operation. The lights located adjacent to the insulated rail on either side of the crossing are intended for the guidance of the trainmen, who are thus informed that protection is being given at the crossing by lights. Trainmen are not permitted to proceed until they get this signal, and when they are unable to get it, conductors are instructed to flag the car over the crossing. This type of signal prevents two cars from entering the crossing simultaneously—a very dangerous practice that does not give the general public sufficient time in many cases to cross between cars.

With both the block signal and the crossing signal there may be used, instead of the insulated rails, a trolley-operated switch that is entirely mechanical in operation, electric current being used only for the light signals and for the bell circuit. This contact switch is operated by the upward pressure of the trolley pole, and on a double trolley line the operation of the switch is not interfered with in any way by the trainman placing the trolley wheel on the trolley wire of either direction. The switch is used in practically the same way as the previously mentioned insulated rail sections for signal purposes, one switch being mounted on a separate pole at either end of the block.

For the crossing signal it is necessary to use one trolley contactor switch at each side of the crossing. The current to operate the bell and to illuminate the lights is taken from the trolley, the bell and lights being in series. In this case the motorman is not permitted to proceed unless he gets his proper signals through the lights, indicating that the crossing is protected by both bell and lights, the lights vibrating or giving a flash effect due to the vibration of the bell. Either of the above-described signals, which were originated and patented by Robert D. Beatty, general manager Cleveland & Eastern Traction Company, can be installed at a very nominal cost.

Aluminum wire has been used for more than 50,000 miles of transmission line of which, according to the engineers of the Aluminum Company of America, about 15,000 miles are in the Pacific States.

The Spring Type of Post Casing

A Moisture-Proof, Rattle-Proof Device Permitting Ready Removal of Sash

Until very recently the window system of a car built with steel upper framing was customarily made up by attaching to the T-posts grooved wooden runways for sashes and curtains, as well as the wooden pilasters. This method of construction was early discovered to be not thoroughly efficient, because the wood had a tendency to swell when subjected to dampness. The demand for a post that would not be affected by moisture eventually became so strong that the attention of The J. G. Brill Company was turned to the subject of an all-metal post, and the result has been the Brill "renitent" post, whereby there is provided a post casing that has in its favor the advantages of being water-tight, rattle-proof and safe against dropping the sash, and of being easily removed from its runways without the use of tools.

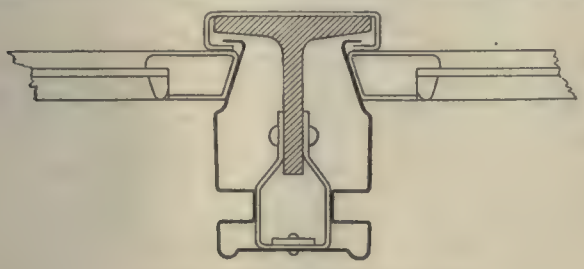
The post-casing, which gets its name from its feature of "offering elastic resistance to pressure," consists of a casing of spring brass attached to the T-post by means of clips fastened to the casing and fitting into stirrups riveted to the post. The feature of ready removal without the use of tools is of tremendous importance. Ordinarily, the removal of a sash from its casing involves careful handling of tools by a mechanic and consequently the loss of some little time. However, with the renitent post the sash may be taken from its casing simply by pulling it out. This means that the operation is one that can be performed by anyone and that does not require the services of a mechanic. However, the sash cannot be removed from its casing as a result of the casual pressure exerted by a passenger in raising or lowering. Also, no wind pressure, no matter how great, can disturb the sash.

Another very great advantage of the renitent post is



REMOVING SASH FROM SPRING-TYPE SASH GUIDER

that rattling is absolutely prevented by the elastic pressure that is exerted on the sash stiles by the spring-brass runways. This feature also guarantees the passenger against accident to his hands or arms which may be resting on the window sill and which might be injured by the sash dropping suddenly. If the catches should become unfastened the sash will drop gradually. A very great advantage given to the sash by this check on its dropping is that the sashes cannot be racked or the glass broken by careless handling. The spring brass casing gives a uniformity of pressure which does away



SPRING TYPE OF SASH GUIDE

absolutely with fitting sashes individually into their runways as must be done with sashes which are constructed to slide in wooden runways. Consequently the sashes are interchangeable from window to window and from car to car, where the windows are similar.

Still another advantage of the resilient post—and one that, although named last, by no means is the least important—is that the post casing may readily be removed from the T-post, thus making the latter easily accessible if it should be necessary to make inspections or repairs in case of collision. The clip-and-stirrup method of attaching the casing to the post is very effective although it is simple, and it absolutely prevents the casing from becoming loose.

The renitent post is considered to be better than the wooden construction not only because of its many mechanical advantages, of which the most important have been cited, but also because it presents a much better appearance than can be obtained with wood, making a lighter and considerably neater looking post than does the wooden post. This improved appearance is not the result of any sacrifice of strength, the pressed form of the post casing giving it sufficient strength in every direction to prevent it becoming dented or injured except by very heavy blows.

Because of the curving sweep which has to be given the casing, the renitent post system is not adaptable to the Brill semi-convertible type of car. However, the post may be attached to any other type of city or interurban car, and it is readily applied to the double-window post construction that is found in interurban cars built with twin windows. In this twin-post construction the gap between the post on the inside of the car is bridged with a sheet steel cover which is fastened into the curtain groove on the sash side of each of the twin posts. The renitent post is made in a range of sizes covering every width of post.

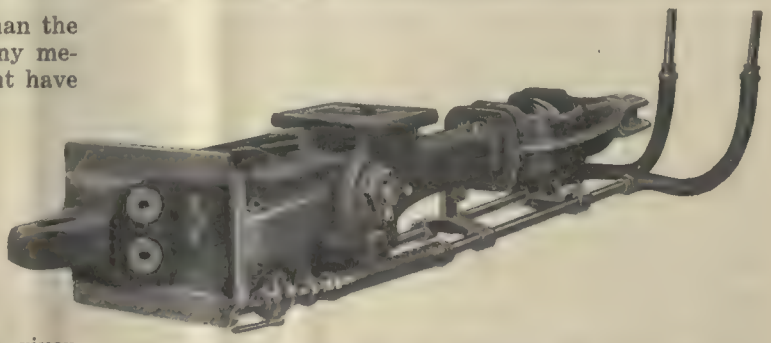
The injurious effects of skidding by electric cars were illustrated by C. V. Wood, shop foreman Newport News, & Hampton Railway, Gas & Electric Company in a paper delivered before the local company section of the American Electric Railway Association. He estimated that in sliding 10 ft. a 30-ton car develops sufficient heat to melt 0.59 lb. of metal per wheel, while a wheel carrying 20,000 lb. with a flat spot 3 in. long strikes the rail with a force of 104,000 lb. when running at 16 m.p.h.

Automatic Car and Air Coupler for City Cars

This Coupler Obviates the Necessity for Men to Stand Between Cars When Coupling

A recent design of automatic car and air couplers brought out by the Van Dorn Coupler Company, Chicago, for city and light interurban service embodies several new features. These couplers are carefully machined to make a perfectly rigid connection when coupled together, the two heads being held in this rigid contact by means of the locking mechanism, and the rigidity at the connection made possible by virtue of the suitable joints behind the heads to provide the necessary vertical and lateral movement. The horizontal movement pivots about the bolt through the inner end of the coupler, while the vertical motion is pivoted at the horizontal bolt just back of the head and unlocking lever. In spite of this exactness of fit, the couplers will properly come together and lock, it is claimed, though they may be 3 in. out of alignment, and they are sufficiently flexible to operate under conditions where the car platforms may assume a difference in level of 10 in.

A lever, located on top of the head where it is readily accessible from either side, lifts up and turns through 45 deg. to unlock the device. When in the normal position this handle lies between two lugs on the head which protect it from breakage by striking the platform or chains, and this horizontal position of the lever gives more clearance for the free working of the coupler. When operating this unlocking device, a special mechanism holds the coupler unlocked after the lever has been turned through 45 deg., the handle going back to the normal position when released. This catch on the locking mechanism is automatically released when the



AUTOMATIC CAR AND AIR COUPLER FOR CITY CARS

two couplers part, or (if the coupler has been unlocked while not in connection with another car) when they come together, so that there is no necessity for a man to stand between the cars when coupling or uncoupling. In other words, the coupler is always ready to couple-up without attention being given to the locking mechanism. The lock is complete in each coupler and thus makes a double lock when two are coupled together, and as long as either one is locked the connection is held in the same rigid condition. All obstruction to the free operation of the locking lever is removed by placing the two air pipes on the underside of the coupler with the valves just behind the face plate where they are conveniently located to be reached by the trainman, both from either side. The mechanism is so designed that any wear in any part of the mechanism is automatically taken up as it develops so that the connection remains as rigid as ever throughout the life of the coupler.

The coupler heads are held in normal coupling position by a flexible supporting device underneath the



FULL DINING CAR ARRANGEMENT OF THE CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD COMBINATION PARLOR AND DINING CAR

drawbar shank, and the whole coupler is supported by means of lugs cast on the top of the shank which engage the carrier sliding on the radial bar. This flexible device supporting the head is adjustable to allow for sagging of platforms, wearing down of wheels, etc.

The Van Dorn patented draft gear especially adapted to city service is utilized with the new coupler. The slot seen in the coupling nose is for use when coupling with other style Van Dorn couplers. The length of the new couplers is 4 ft. 6 in. The pronounced rigidity of connection secured at the coupler heads of course increases the life of the couplers and insures against air leakage.

Over 200 of these couplers are in use on the cars of the Pittsburgh Railway, where the hilly conditions place rather exacting strains on coupling devices. Some 520 more of them are being made for this company which has now practically standardized on this type of equipment.

Combination Dining and Parlor Cars for Chicago, North Shore & Milwaukee Railroad

With the completion of three new all-steel cars now under construction at the Jewett Car Company's plant, the Chicago, North Shore & Milwaukee Railroad will begin a dining and parlor-car service between Chicago and Milwaukee. This is expected to be in operation soon after the first of February and its inauguration will be another link in the series of improvements and refinement of the service, roadbed and equipment of this road since it came under the control of Britton I. Budd. These new cars are to be of the standard design of the North Shore road and equipped with four motors and multiple-unit control so that they may be operated as part of a train or individually if engaged for a private party. The interior arrangement of chairs and tables is to be such that the cars may be entirely devoted to dining service or entirely to parlor-car service, or partly to both at the same time. The chairs are so dimensioned as to fit into either arrangement without the necessity to store any away. These two arrangements of the chairs are shown in the accompanying illustrations. There will be nine tables and twenty-two chairs, and stationary seats at the bulkheads for twelve passengers, making the total seating or dining capacity thirty-four persons. The kitchen is to be fully equipped to serve, as Mr. Budd says, "not elaborate meals, but everything good and at popular prices."

In the rearrangement from parlor car to diner, there is one chair extra in the smoking compartment which makes up the one short in the main compartment. Changing back, the tables all fold up and are stored in a locker at the front kitchen bulkhead. Thus after a meal is served the passengers may be made comfortable by putting the tables away and rearranging the chairs. There will probably be call for this equipment as special chartered cars for parties from the North Shore towns into Milwaukee and into Chicago, especially the latter with a station of the elevated lines in Chicago at the very door of the Auditorium theater, where all grand opera and other important social gatherings are held. The interior of the cars will be mahogany finish and the chairs solid mahogany with leather upholstery giving, with the center and side post lighting, a very attractive appearance.

An Easily-Made Phase-Rotation Meter

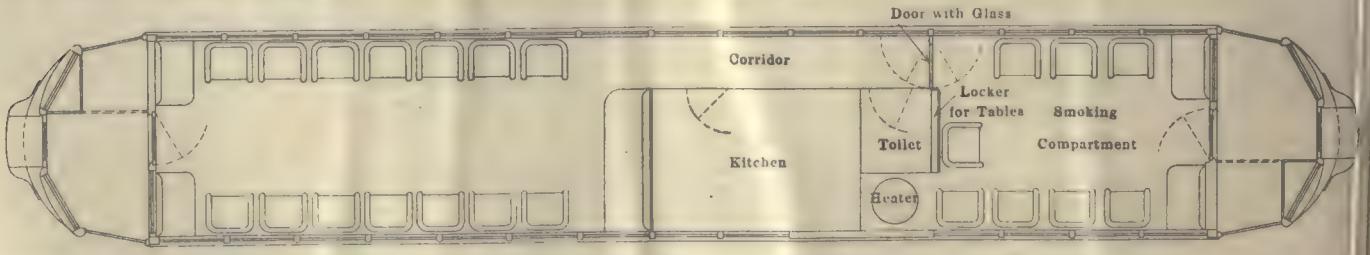
When a three-phase generator is to be connected to a live system, its phase rotation must be in the same direction as that of the system. For determining this phase rotation an easily-made instrument was devised by E. P. Peck, Georgia Railway & Power Company, Atlanta, Ga.

The instrument consists essentially of a watt-hour meter disk mounted in its bearings directly over three symmetrically spaced telephone bell coils. When this instrument is connected to a three-phase system the disk revolves in one direction or the other. The instrument is then transferred to the generator cable and if the disk revolves in the same direction as before the phase rotations are proved to be the same, and vice versa.

Oil-Insulated Cable Joints

A method of impregnating cable joints with oil has been developed by the Metropolitan Engineering Company, New York City. After a joint is made, a special sleeve having an opening for filling with oil is put on. For voltages under 16,000 the oil is simply poured through this opening.

When used on cables for voltages of more than 16,000 a special apparatus is used for producing a vacuum inside the sleeve so that when the oil is poured in it penetrates more completely than if put in under atmospheric pressure. It is claimed that the joints made by these methods operate satisfactorily under the worst conditions.

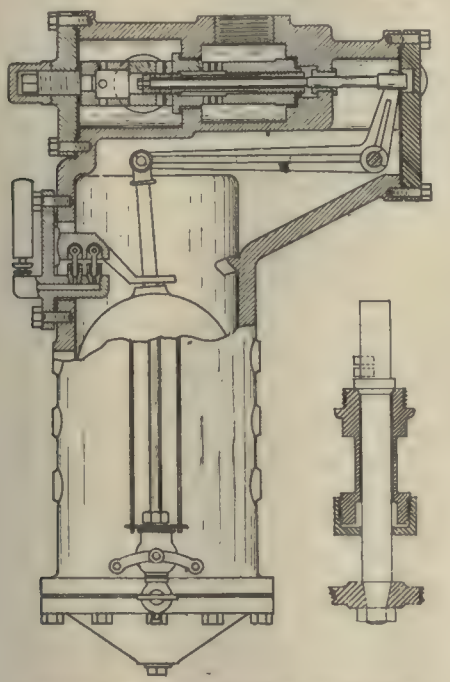


PARLOR CAR ARRANGEMENT OF THE CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD COMBINATION PARLOR AND DINING CAR

Continuous Feed-Water Regulator

A regulator for providing a continuous flow of feed water proportionate to the evaporation has been developed by the Ray Manufacturing Company, Louisville.

Essentially it consists of a perfectly balanced valve operated by a float. The feed water is admitted to the



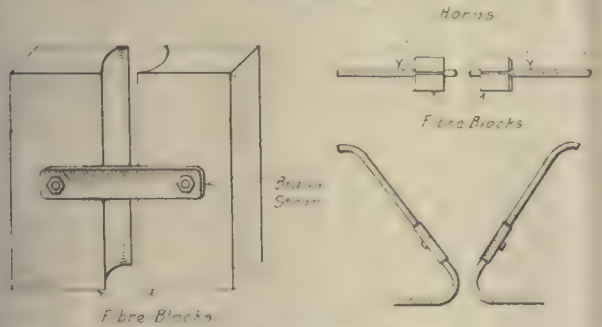
CONTINUOUS FEED-WATER REGULATOR

valve at its center and is discharged at one end in a coninous flow controlled by the position of the float.

A high and low-water alarm whistle is operated by two contact points on the float rod. The whistle lever is counter-balanced to hold the whistle valve closed when pressure is off the boiler.

Preventing Birds from Grounding Lines

Small birds have in the past been a source of considerable trouble on the lines of the Georgia Railway & Power Company. By alighting on the horn gaps of



DEVICE TO PREVENT BIRDS GROUNDING LINES AT HORN GAPS

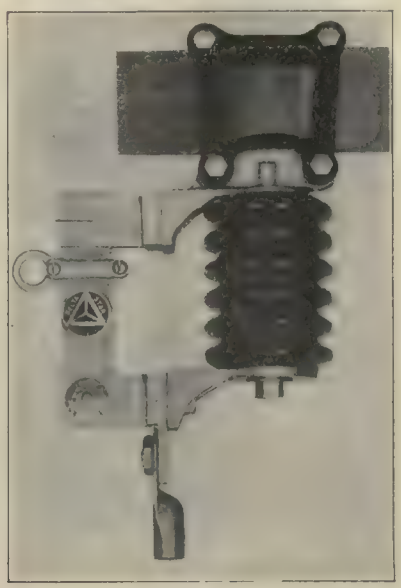
the lightning arresters they grounded the lines through their bodies and caused the automatic switches to trip out in a number of cases. To prevent such disturbances the device illustrated herewith was built under the direction of T. F. Johnson, superintendent of lines.

The device consists of two ½-in. horn-fiber blocks, 5 in. by 2½ in. each, connected together by a spring-brass strap. The heads of the bolts holding this strap are countersunk and sealing wax is poured over them. The inside edges of the blocks are grooved so as to fit on the horn. By bending back the outer edges of the blocks, the inside edges are forced apart far enough to enable them to slip over the horn. On releasing, the spring strap causes the blocks to clamp firmly on the horn. The device is placed with its bottom edge at the smallest point of the gap and with the strap on the lower side.

The only part of the gap left unprotected is above the blocks where it is so wide that no harm can be done by a bird alighting upon the horn.

Bus-Type Disconnecting Switch

A disconnecting switch which can be installed in very close quarters has been put out by the Delta-Star Electric Company, Chicago, Ill. A clamp which fits directly over the busbar serves to support the switch. Fastened to this clamp is one of the blades of the switch as shown in the accompanying illustration. A corrugated porcelain cylinder securely fastened to the clamp holds at its



DISCONNECTING SWITCH CLAMPED TO BUSBAR

lower end the hinge blade of the switch. On this end is also mounted a terminal block for connecting a circuit to the bus.

On account of its compactness this switch is well adapted for installation between a busbar and an oil switch mounted in the same bus structure. When the disconnecting switch is open the oil switch may be examined and repaired without danger. It may also be used to disconnect motor, generator and other circuits from the bus and to separate different sections of a bus.

Temporary Substation Quickly Built After Fire

Quick action in an emergency caused by the burning of a substation enabled the Hudson Valley Railway to resume normal operation just five days after the fire started. The substation was located at Wilton, N. Y., halfway between Glens Falls and Saratoga Springs, which are 20 miles apart. A temporary wooden building was constructed to house the rotary loaned by a neighboring company, the Schenectady Railway, and in the short time named above the station was put into operation and has been running satisfactorily ever since. During construction of the new building regular service was maintained by feeding the line from both ends and running light cars instead of the heavy interurban cars.

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

Another New Jersey Statement

President McCarter of the Public Service Corporation Reviews Recent Increases in Costs

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, Newark, N. J., has issued a statement to the public dealing with a number of problems before the company. Mr. McCarter emphasizes that the corporation is confronted with rising costs in materials and labor, with an income limited by the fixed rates it can charge for transportation, gas, and electricity. He dwelt particularly upon the problems of rising material and labor costs, specifying these recent price changes:

Coal: $4 a ton paid above contract price in open market when contractors failed to make deliveries. Copper: Hard to get at 38 and 40 cents a pound, though selling at 28 cents a year ago, and in the past could be bought for 11 and 12 cents. Manganese steel, for track intersections, curves, and switches: $500 per ton, formerly $100. Other metals and metals used in car building: Increased 100 per cent. General average increase in cost of all railway materials, about 40 per cent. Mr. McCarter said in part:

"There is nothing magical about public utilities which enables them to escape the inexorable laws of trade. Every upward tendency in the price of materials and the price of labor must be met by the public utility just the same as it must be met by the merchant and the manufacturer. But there is this distinction: public-utility rates are fixed, and increases in cost of production must be absorbed by the operating company. The company's loss in this respect has been the consumer's gain. The Public Service Corporation has met extraordinary conditions during the last year and has met them without shifting any of the burdens to its patrons. Might it not be well for the public to ponder what must happen if the price of labor, the cost of materials, and the amount of taxes levied continue to mount year by year."

As the conference of committee members of the Republican majority of the 1917 Legislature has decided to put through a bill taxing gross receipts of New Jersey utility companies 5 per cent, Mr. McCarter's statement of the rising costs of utility corporations is accepted as the beginning of his campaign of protest. Mr. McCarter had frankly said that the corporation would keep representatives at Trenton just so long as legislation inimical to the corporation was introduced there, and just so long as the corporation desired the passage of what he believed to be just and reasonable measures. This course he made plain in a statement to the public republished in full in the Electric Railway Journal of Dec. 2, page 1171.

Fare Hearing in Milwaukee

Milwaukee Company in Emergency Plea Seeks to Increase Fare to Establish Eight-Hour Day and Wage Advance

The hearing before the Railroad Commission of Wisconsin on the application of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company for a readjustment of fares and hauls to permit the company to earn enough additional revenue to establish the eight-hour basis throughout their organizations and to grant increased wages offsetting the increased cost of living was begun in Milwaukee on Jan. 5 and continued on the morning of Jan. 6. The hearing then went over until Jan. 15 at 10 a. m.

The plea of the companies was presented to the commission recently as an emergency measure. It has nothing to do with the petition for relief dated Nov. 6, 1915, and their commission has limited the scope of the emergency hearing to the single question of permitting the companies to earn enough additional revenue to give their employees the eight-hour basis and higher pay. The companies explained their case to the public through newspaper space, saying that every dollar of the increased revenue for which they were asking, if granted, would be paid to their employees. They estimate the cost of the eight-hour basis at $401,345 yearly and that of the proposed wage increase at $230,946 yearly, or a total increase of $632,791 yearly. In its petition to the commission the companies said:

"Your petitioners are desirous of placing into effect the basis of an eight-hour day throughout their entire organizations.

"To put such eight-hour day into effect and permit your petitioners' trainmen and other employees to receive as large a monthly wage as they now receive will involve an increase of approximately 25 per cent in hourly rate of pay for such trainmen and other employees, or its equivalent.

"Your petitioners also are desirous of making a further increase in wages for their trainmen and other employees in order to meet the present increase in the cost of living.

"Your petitioners are unable to put in force the basis of an eight-hour day for their trainmen and other employees, or to make this increase in wages, because of the inadequacy of your petitioners' earnings.

"The present situation of your petitioners is such as to constitute an emergency requiring relief forthwith, and immediate alteration and amendment of the rates and schedules of your petitioners' railways."

The petitioners have made the following public announcement:

"Every dollar of this increased revenue for which we are now asking if granted is to be paid to our employees.

"Our investors must wait for the relief that is due them until the commission at a later date is ready to consider all of the issue presented in our petition of Nov. 6, 1915."

Increase in Wages in Toronto

The Toronto (Ontario) Railway on Dec. 21 announced an increase in the wages of its men dating back to Nov. 1. The increase applies as follows:

Motormen and Conductors

For first year, from 23½ cents an hour to 26 cents.
For second year, from 25½ cents an hour to 28 cents.
For third year and after, from 27½ cents an hour to 30 cents.

Shedmen

Foremen, from 27½ cents an hour to 30 cents.
Operating shedmen, from 24½ cents an hour to 27 cents. Men who operate cars and do general shed work.
Shedmen, doing general shed work, but not operating cars, 26 cents an hour.
Car washers, from 23½ cents an hour to 25 cents.

Motor and Truck Repair Men

For first year, from 23½ cents an hour to 26 cents.
For second year from 25½ cents an hour to 28 cents.
For third year and after, from 27½ cents an hour to 30 cents.

Employees in other departments who have not had an increase in wages since the agreement was signed will be dealt with upon their merits. In taking this action the company has been influenced solely by the change in living conditions and the additional burdens placed upon the employees as a result of the war.

Aurora, Elgin & Chicago Arbitration

Wage Increases Awarded to City Line Trainmen, Fox River Division Trainmen and Certain Shop Employees

The arbitration proceedings between the employees of the Aurora, Elgin & Chicago Railroad and the company have been completed. The taking of testimony in the case was begun on Sept. 25, 1916. The testimony in full consisted of 3102 pages of typewritten records and 228 exhibits. The board of arbitration points out in its findings that the present day cost of living, based on information obtained generally and locally, and figured on the weights given the items composing the family living budget, by Mr. Mahon, international president of the Amalgamated Association, is 31.9 per cent higher than in 1901. It was also stated that the wages of the employees have increased between 60 per cent to 85 per cent in the same time, and thereby, that the present-day purchasing power of the wages on this road is considerably greater than in 1901.

Bion J. Arnold testified that he had made a valuation of the company's railroad property and found it to be worth in round numbers $11,400,000. He also said that the company would be entitled to earn 7 per cent on this amount, or $798,000, as a fair annual net return for railroad operation. It is not making anywhere near this amount at the present time, nor has it done so for several years.

The testimony showed that in most of its departments the company under its last agreement with the association was paying much higher wages than almost all other similar companies, and higher also than the wages paid to men in other employment in the territory served by it.

The board found that provision should be made for a minimum wage of 25 cents an hour to all power house and shop employees at Aurora, Elgin and Wheaton, employed more than one year by the company and made this award to those who have been receiving less than that amount.

In the transportation department, the award to trainmen was as follows: On the third-rail division, where the wages are fixed by the 1913 agreement at 30, 33 and 36 cents an hour, the testimony showed that nearly all the men are drawing 36 cents an hour and that some of these men earn as high as $1,400 and $1,500 a year, the average being $1,225. The board states that "it seems that they are certainly well paid and receiving all that they should reasonably receive under the facts as shown in this case."

On the Aurora and Elgin city lines and Fox River interurban lines, including the Elgin-Carpentersville, the Elgin-Aurora, and the Aurora-Yorkville interurban lines, the trainmen on regular and extra runs were granted an increase of ½ cent an hour for the first year of the contract, and 1 cent an hour for the second year of the contract, added to the 1913 agreement which was previously as follows:

	First Year	Second Year	Third Year
Aurora-Elgin	30	30	30
Aurora-Yorkville Elgin-Carpentersville	28	28	28
City Lines, Aurora and Elgin	23½	24½	26½

In its finding, the board states that it is of the opinion that the company should be entitled to earn a net annual return from the operation of its railroad property at the rate of 7 per cent after the payment of reasonable wages to the employees and all other operating expenses. Then it states that if the company makes during the present fiscal year such a net profit in its railway operation on the value of $11,400,000 set by Mr. Arnold, there should then be added to the wages of each of the employees, during the second year of the contract, 1 cent an hour.

Pay at the rate of time and one-half for overtime, Sunday and holiday work was awarded to the night shop men in Aurora and Elgin, to make their rate of pay conform with that prevailing in the other shops of the company. The finding also makes some changes in the agreement as to working conditions. The new contract between the employees and the company is made effective as though dated June 1, 1916, and continues in force for a period of two years thereafter. All wage increases are effective from June 1, 1916, and the accrued increases are accordingly allowed."

New York Commission Reports

Second District Commission Submits Tenth Annual Report to Legislature with Recommendations for Further Legislation

The tenth annual report of the Public Service Commission for the Second District of New York was submitted to the Legislature on the evening of Jan. 10. The report calls the attention of the Legislature to three changes in the powers of the commission effected by court decisions during the year which have had a far-reaching effect and which may require important legislative action. These changes include the decision of the Court of Appeals in the Ulster & Delaware Railroad's appeal, where it was held that the commission had power upon proper showing to permit an increase of the mileage book rate above 2 cents a mile, notwithstanding the "mileage book law" which restricted it to that figure. The court held that the public service commissions law of 1907 superseded all previous enactments and gave the commissions absolute power over rates.

The Court of Appeals decision in the New York and Queens gas case is also called to the attention of the Legislature. The court there held that the Appellate Division has not the power to review the reasonableness of a decision of the commissions, but only to annul the order for some violation by the commission of a rule of law. These two decisions, it is believed, give the commissions the almost absolute power over rates and service which was contemplated when the law was passed in 1907.

The courts have defined the powers of the commission under the jitney bus law and the commission has established the policy that no jitneys will be permitted to compete with existing street railways where the latter are giving reasonable service. As a result only two jitney lines are now operating exclusively within city limits in New York State outside of Greater New York. Wherever suburban lines come into cities, the certificates of convenience and necessity of the jitneys have been so drawn that they cannot carry local city passengers in competition with trolleys.

The commission calls attention to the fact that the bus lines operating outside of cities are now not subject to any control as to service, safety, rates, or their competition with existing carriers and recommends that the existing law be modified so that bus lines will not be required to file the elaborate schedule and reports required of other common carriers.

An important request for the extension of the power of the commission over the physical surroundings of grade crossings is made. In a number of cases where the expense of eliminating a grade crossing would not be warranted by the greater safety to be attained, the commission has found that the removal of brush or other obstructions to vision would make the crossing as safe as reason would require. The commission asks that it be given power to order these changes in the surroundings of grade crossings and the power to apportion the expense thereof as is now done with eliminations.

An analogous extension of power over the grade crossings of electric railways will also be asked, but as this will probably be coupled with recommendations to be contained in the report of the conference which the commission has been holding for a year with representatives of electric railways and automobile clubs throughout the State with regard to greater safety in all respects at electric railway grade crossings, specific recommendations will not be made until this conference completes its report in the near future.

The commission recommends minor changes in the law to facilitate its accounting supervision of corporations under its jurisdiction.

The report contains its usual array of statistics of interest chiefly to the operators of the utilities concerned. The accident figures show no considerable change, despite the great increase of business during the year.

The commission asks for appropriations this year of $421,000 as against $404,000 last year, and urges in the strongest terms that the Legislature repeat its appropriation for grade-crossing elimination work, as many important eliminations are now pending for which no funds are available.

United Railroads Increases Wages

First-Year Men Get 2 Cents an Hour Advance and Others 1 Cent

Just before the New Year there was posted in the carhouses of the United Railroads, San Francisco, Cal., an announcement of an increase in the wages of the platform men from President Lilienthal, in which he said: "The year 1916 has been a very hard year for the company. There has been a further very large decrease in the earnings, owing to the competition of jitneys, other automobiles and municipal lines—the cost of all materials has been largely increased—the presence of the jitney has greatly increased the number of accidents, and a reorganization of the company's finances has not yet been accomplished. But the management realizes that the cost of living has been constantly growing higher, and that it has been becoming more difficult to make ends meet, and I have been impatient to show you some practical appreciation of the admirable manner in which you are performing your duties and of the support and loyalty that you have manifested to the company. So that, while we are not even paying the interest on our bonds, I have approved an increase of wages recommended by Mr. von Phul, which he will publish in a separate bulletin."

In conjunction with this there appeared a notice from William von Phul, vice-president and general manager, to the effect that "beginning Jan. 1, 1917, the wages of platform men who have served one year or less will be increased 2 cents an hour. Wages of those who have served one year or more will be increased 1 cent an hour." The new scale of wages on this basis is as follows:

During the first six months	27 cents an hour
During the second six months	28 cents an hour
During the second year	29 cents an hour
During the third year	30 cents an hour
During the fourth year	31 cents an hour
During the fifth year	32 cents an hour
During the sixth year	33 cents an hour
During the seventh year	34 cents an hour
During the eighth year	35 cents an hour
During the ninth year and thereafter	36 cents an hour

Philadelphia Retains Ford, Bacon & Davis

Mayor Smith of Philadelphia, Pa., has retained Ford, Bacon & Davis, New York, N. Y., as expert advisers to the city, in connection with the proposed agreement between the Philadelphia Rapid Transit Company and the city regarding the contemplated high-speed elevated and subway lines. The Mayor has declared that he will see that all the conferences and meetings at which the proposed agreement is discussed are open, in order that the newspapers may keep the people informed of every move made in the matter. Ford, Bacon & Davis were retained some time ago by the then Director of Public Transit, A. Merritt Taylor, to consult with him on the so-called Taylor plan. William S. Twining was designated at that time as the expert for Ford, Bacon & Davis, and he subsequently succeeded Mr. Taylor as director.

St. Louis Settlement Conferences Postponed

Conferences with the officials of the United Railways, St. Louis, Mo., to discuss a settlement of the mill tax and franchise problems have been halted by Chairman Gregory of the public utilities committee of the Board of Aldermen. Mr. Gregory is quoted as stating that no further conferences with United Railways officials will be held until all free bridge and the Terminal Ranken tract legislation is disposed of. From present indications he is said to doubt whether these bills will be reported out in time to finish the United Railways compromise problem before the close of the aldermanic session. He recently called a meeting of the general conference committee to discuss the United Railways compromise, but called off the meeting when newspapers printed the terms of a tentative proposition Mr. Gregory's committee proposed to make to the railway in response to the company's compromise offer.

Contractors' Papers Purchased

McGraw Publishing Company Buys Two Chicago Contracting Papers

The McGraw Publishing Company, Inc., New York, N. Y., publisher of the ELECTRIC RAILWAY JOURNAL, has purchased *The Contractor* and *Contractor's Review*, both of Chicago, and will consolidate them under the name of *The Contractor*. The new paper will continue to devote itself to the interests of the contractor engaged chiefly in local work and of the contractors' superintendent. It will be published at Chicago every other week, and the subscription price will be $1 a year. The editorial and advertising policies will be directed by the staff of the *Engineering Record* with E. J. Mehren, editor of the *Engineering Record*, as editorial director and C. S. Hill as acting editor. Mr. Hill has been the editor of *Contractor's Review* and was formerly managing editor of *Engineering and Contracting* and associate editor of *Engineering News*. The other papers in addition to those mentioned which are owned by the McGraw Publishing Company, Inc., are the *Electrical World*, *Electrical Merchandising* and *Metallurgical and Chemical Engineering*.

Fire Ravages Pottsville Plant

Twenty cars, mostly of the open and service types, were burned and railway, lighting and power service was temporarily suspended by a fire on the evening of Jan. 6 which destroyed the carhouse and part of the roof of the power house of the Eastern Pennsylvania Railways at Palo Alto, Pa. According to an account of the fire related by J. H. Pardee, president of the company, to a representative of the ELECTRIC RAILWAY JOURNAL, although the turbines in the power house became flooded with water at the time, none of the generating apparatus was seriously damaged, and by 2.30 a. m. on Jan. 7 lighting service was resumed in Pottsville and a portion of the other districts served by the company. By the night of Jan. 8 electric light and power service was entirely restored. Electric railway service was largely resumed on Jan. 9 and by the following day was in practically full operation again. The total loss involved in the fire, which Mr. Pardee estimates roughly at $200,000, is fully covered by insurance. The J. G. White Management Corporation, New York, is operating manager of the property.

Underground Terminals for Cleveland

At an open meeting of the subway committee of the City Planning Commission of Cleveland, Ohio, on the evening of Jan. 4, a decided sentiment developed in favor of underground terminals for the street railways in the downtown district. Both the members of the committee and citizens who attended the meeting expressed themselves in such a way as to give an impression of opposition to the proposed underground plan for which the Cleveland Underground Rapid Transit Company holds a franchise. Fielder Sanders, street railway commissioner, expressed himself in favor of the terminal idea. Chairman Morris A. Black asked the county engineer to put into writing suggestions made at the meeting which cover the following points:

A complete survey of the traffic conditions to be alleviated by the subway terminal to be built by the city.

Preparation of a tentative contract between the city and the Cleveland Railway for the use of the subway.

Presentation to the public of exact figures showing the cost of the proposed subway system, the benefits it would bring and what the railway would have to pay for its use.

The utilities committee of the Cleveland Chamber of Commerce has for two years or more been giving this phase of railway traffic close study. Its report may be made to the chamber within a short time. It is understood that the committee does not favor the construction of the subway terminals by the city. Rather, it would have the terminals built by the Cleveland Railway under the Tayler franchise. A study of the situation at Boston is said to have convinced the members that this improvement will increase business to such an extent that the additional investment would not endanger the present rate of fare. The committee does not favor building long underground lines.

Trial of Strike Damage Case

After a series of prolonged delays the trial of the action brought against the County of Erie by the International Railway, Buffalo, N. Y., in an effort to recover $108,410 damages for property alleged to have been destroyed during the street railway strike riots in the spring of 1913, was started before Justice Louis W. Marcus in the Supreme Court of Erie County on Jan. 6. After obtaining a jury, Thomas A. Sullivan, former county attorney, who appears for the defense, argued for the dismissal of the complaint. He contended that the entire county could not be held responsible for damage done to the company's property within the city of Buffalo. The court must render a decision on this point before the witnesses testify.

James O. Moore, of Norton, Penney, Spring & Moore, of counsel for the International Railway, opposed the dismissal of the suit. He reviewed briefly the efforts of the city and later the county to stop the riots and damage to the company's property. He said the city police were unable to stop the riots and hundreds of extra police were sworn in by Michael Regan, who was then chief of police. As the city was unable to restore order, the International Railway appealed to the county authorities, according to Mr. Moore, and when this agency was unable to handle the situation, Mr. Moore argued that on the company's application two regiments of the New York National Guard were pressed into strike and riot duty. In continuing his argument against the dismissal of the complaint against the county, Mr. Moore declared that the county should be required to defend the action as the county sheriff has greater authority in handling strike riots than the city police department. A similar action is pending against the city of Buffalo and Mr. Moore argued that the city and county should be held jointly responsible for damage to the company's property because of the failure of the city and county authorities to afford adequate protection.

Scores of witnesses have been subpoenaed by the International Railway in its efforts to prove every item of damage listed in its complaint and bill of particulars which was demanded by the county. Almost a score of newspaper men who were assigned to "cover" the strike, including the Buffalo correspondent of the ELECTRIC RAILWAY JOURNAL, have been subpoenaed to tell of specific acts of rioters who broke car windows, intimidated loyal employees and caused other damage to the company's property in all sections of the city. In some instances members of the National Guard who were called to do strike duty are accused by witnesses of having aided in destroying the company's property.

Old Street Railway Ordered Removed.—The City Commission of San Angelo, Tex., has ordered the rails and ties of the old San Angelo Street Railway removed from the city streets. The tracks are the property of J. D. Suggs, who operated the system for several years. The city recently granted a franchise to the Interstate Electric Corporation, New York, which will install and operate a street railway system here. Mr. Suggs about a year ago offered to present the old railway to the city.

Municipal Power Sales to Street Railways.—When Massachusetts cities and towns were first authorized to engage in the manufacture or distribution and sale of electricity in 1891, they were excluded from supplying it for the operation of electric cars. In its annual recommendations for legislation just filed with the General Court, the Gas & Electric Light Commission states that any justification for this restriction has long since ceased to exist and recommends authorizing municipal plants to distribute and sell electricity for this purpose if they see fit.

Louisville Veteran Dead.—Patrick J. Lally, Louisville, Ky., after nearly forty years' service in the employ of the Louisville Railway, is dead of pneumonia at his home in Louisville. Inspectors and old employees of the company were his pallbearers. "Pat" Lally began as driver, lasting one day, after which he was put in charge of the old transfer station. He had been for many years an inspector and was known personally to thousands. His popularity was attested by the fact that he was chosen in a newspaper popularity contest to make a trip covering the East.

Experiment with New Car Gate in New York.—At a hearing on Jan. 8 before the Public Service Commission for the First District of New York, George Keegan, assistant to Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, agreed that the company install for trial types of folding platform gates on the Third Avenue elevated line, similar to those in use now in Brooklyn. The cost, Mr. Keegan said, would be about $75 a car, and upon his statement the case before the commission, dealing with the question of a new type of gate, was closed pending the result of the trial. The company will experiment with several types of gates on the two trains.

Illinois Jitney Men Lose.—The jitney bus men of Rock Island and Moline, Ill., have lost the first round in court in the injunction sought by the Public Utilities Commission to restrain them from operating until certificates of convenience and necessity are secured. Judge Ramsey overruled a motion for rule upon Attorney-General Lacey and C. J. Searle, attorney for the Tri-City Railway, to show cause why they should not be permitted to maintain the action. The court held, however, that the demurrer filed by the jitney bus men against the injunction petition was proper and it is upon this manner that the petition itself will be argued to the court.

Bonuses in Indianapolis.—The Indianapolis Traction & Terminal Company, Indianapolis, Ind., has paid bonuses to 500 conductors and motormen, ranging from $30.33 to small amounts. This is in keeping with the announcement made by the company last July that a sum would be paid equal to what the men would have received had the increased wage scale gone into effect on July 8. The company announced in July that the new wage scale would go into effect on Jan. 1 and that bonuses would be paid to compensate the men for that time from July to January. From Jan. 1 conductors will receive 22 cents an hour for the first year of service to 30 cents an hour for men who have been in the service for seven years or more.

Final Hearings Soon on Riverside Plans.—Although opposition to the city's plan for improving Riverside Drive, New York City, and relocating the tracks of the New York Central Railroad along the west side has increased steadily since the plans were made public nearly a year ago, indications are that the Board of Estimate will approve the proposal and that the work will proceed within the next few months. Mayor Mitchel and Controller Prendergast were responsible for the original plans. Final public hearings will be held before the Board of Estimate within a week or two and then the board will act upon the proposed contract with the New York Central Railroad. This contract will include a provision for the electrification of the line.

Increase in Wages in Oklahoma City.—On Jan. 1, 1917, the Oklahoma Railway, Oklahoma City, Okla., voluntarily made the following raise in wages to conductors and motormen: First year, from 20 cents an hour to 21 cents an hour; second year, from 22 cents an hour to 23 cents an hour; third year, from 24 cents an hour to 25 cents an hour; fourth year, from 25 cents an hour to 27 cents an hour; fifth year, from 26 cents an hour to 28 cents an hour; sixth year, from 27 cents an hour to 29 cents an hour; seventh year, from 28 cents an hour to 30 cents an hour; eighth year, from 29 cents an hour to 31 cents an hour; ninth year, from 30 cents an hour to 32 cents an hour. The new rates cover both the city and the interurban lines.

Compulsory Strike Investigation Plan Proposed.—On Jan. 6, Chairman Adamson of the committee on interstate and foreign commerce of the House of Representatives introduced the administration's railroad legislation bill providing for compulsory investigation of labor disputes. The bill proposes a special board of inquiry to ascertain the facts in each case and to report as soon as possible with recommendations for a settlement, in no event later than three months from the reference of the controversy to it, all strikes being prohibited during the period of investigation. The bill also provides that the President shall have power to take possession of the railroads in emergencies. The Adamson bill is the same as the Newlands bills now pending in the Senate, except that the former also prescribes an eight-hour day for all railroad employees in interstate commerce.

Central Brooklyn's Transit Problem.—The Public Service Commission for the First District of New York, through Chairman Oscar S. Straus, has submitted to T. S. Williams, president of the New York Municipal Railway Corporation of Brooklyn, the exact position of the Public Service Commission with respect to the solution of the transit problem of Central Brooklyn, including the proposed completion of the third-tracking of the Fulton Street line. This letter followed one from President Williams in which he stated the willingness of the company to agree to certain changes in the plans already formulated for Brooklyn, but to which were added a number of additional conditions to which the commission has declined to agree. The commission informed President Williams, and through him the Brooklyn company, that in the event that it prefers litigation to cooperation the commission, while it would regret such an alternative, is ready to face it.

Injunction Sought in Illinois Traction 5-Cent Fare Case.—City Counselor Daues, of St. Louis, Mo., on Dec. 28, applied for an injunction in the United States District Court to restrain the Illinois Traction Company from increasing the passenger fare between St. Louis and Granite City, Ill., from 5 to 10 cents on Jan. 1. The increase was authorized by the Interstate Commerce Commission. A bill is pending in the Board of Aldermen of St. Louis to repeal the franchise of the company because the rate increase violates a provision in it limiting the fare to and from the tri-cities to 5 cents for adults. The Aldermen refused to direct that an injunction suit be filed by the counselor on the ground that such a suit would conflict with the proposal to repeal the franchise. The United States, the Interstate Commerce Commission and the Illinois Traction Company are named as respondents in the injunction proceedings. Under the law such suits must be tried before at least three federal judges, one of whom shall be a member of the Court of Appeals.

Plans for Large Car Storage Yard.—The Public Service Commission for the First District of New York is negotiating with the city authorities with a view to utilizing a part of the westerly portion of the Jerome Avenue reservoir tract for a storage yard for subway cars in connection with the operation of the Jerome Avenue extension of the Lexington Avenue subway. The westerly portion of the reservoir tract adjoining Jerome Avenue has never been improved by the city. Commission, city and railroad company engineers are studying the tract with a view to determining what portion of it could best be utilized for the purposes desired with the least detriment to other property in the neighborhood. If the city decides to take a sufficient amount of this tract to provide a storage yard for 250 subway cars, it will be possible for the city to make available for other uses a certain sum equivalent to the value of the property taken from rapid transit funds and it will not be necessary to exempt from taxation other property upon which taxes are now paid.

Programs of Association Meetings

Massachusetts Street Railway Association

The regular monthly meeting of the Massachusetts Street Railway Association has been postponed to Jan. 17, at Young's Hotel, Boston, when Joseph C. Pelletier, District Attorney of Suffolk County, will speak on "The Life About Us."

Illinois Electric Railway Association

The annual meeting of the Illinois Electric Railway Association will be held at the La Salle Hotel, Chicago, Ill., on Jan. 19. An interesting program has been arranged to include an exhibition of the moving-picture film, "The King of the Rails," showing the construction of the electric locomotives and the electrification of the Chicago, Milwaukee & St. Paul Railroad. A paper by G. M. Woods, of the Westinghouse Electric & Manufacturing Company, on "The Effect of Low Voltage on Railway Motors," will be read. K. W. Mackall, electrical engineer of the Ohio Brass Company, will read a paper on "Headlights," and M. J. Feron, general superintendent of transportation, Chicago Elevated Lines, will present a paper on "How Trainmen Are Developed into Motormen."

Financial and Corporate

Capital Stock Tax Rulings

Tax Based on Average Value of Stock—Payment Due in Advance for Privilege of Doing Business—Holding Companies Subject to Tax

In an opinion just made public the United States Commissioner of Internal Revenue has made specific rulings on questions that have been raised in connection with the special excise tax of 50 cents for each $1,000 of fair value of the capital stock of corporations, this tax being due as of Jan. 1, 1917, and having an exemption limit of $99,000. It is held that the new tax is a tax on the privilege of doing business similar to occupational taxes on individuals, that it is to be measured by the average value of capital stock during the preceding year and is to be paid in advance like other privilege taxes.

To give the opinion more in detail, it is stated that where the capital stock of a corporation is worth $100 per share, par value, and the corporation reports 10,000 shares, having a total value of $1,000,000, and also reports a surplus of $500,000 and undivided profits of $50,000, the book value of such stock would be $1,550,000. This should be taken as the basis of the approximate value of the stock per share ($155), unless by reason of earning capacity the real value is in excess of the book value, or unless for any reason the book value is fictitious and is shown by overestimating the value of assets.

If the "average profits per share earned during the preceding five years" indicate an "estimated earnings capacity" in excess of the book value, the fair value of the capital stock may be based upon a reasonable return on capital invested, dependent on the hazards of the business and on the prices which the stock of corporations engaged in a similar character of business brings in the open market. If the book value is fictitious and is shown by overestimating the capital assets, this fact should be fully explained and may be given allowance in determining the fair value of stock.

In regard to holding companies, it is said that where such a company owns all the stock of several subsidiary corporations which is not listed on any exchange or which has not been sold in the last fiscal year, the fair value of the stock of such subsidiary companies may be estimated from the market value of the total capital stock of the holding company (the parent corporation) by apportionment of the fair value of the total capital stock of the holding corporation among the subsidiary companies. This, however, does not relieve the holding company from its liability to the special excise tax.

Corporations estimating the fair value of their stock should comply strictly with the provisions in the regulations by taking "the average price at which sales were made during the preceding fiscal year" and not the average selling price per share. Thus, if ten shares were sold at $100, and 1000 shares were sold at $70, the average price at which sales were made would be $85. The average selling price in such a case would be $70.29, but this price will not be accepted as an average fair value. Corporations protesting against this method may file a statement of facts for the Washington office.

The new tax, it is stated, is an excise tax on the privilege of doing business. Being a privilege or occupational tax, it is payable in advance for a period from the time the act goes into effect to the end of the fiscal year and annually thereafter in July, the beginning of the government's fiscal year. The tax is payable to the collector at any time after Jan. 1, 1917, but penalties for nonpayment do not attach until ten days after notice and demand therefor has been served by the collector upon the taxpayer. It is a condition precedent that a corporation to be liable to the tax must have been engaged in business some time during the preceding taxable (fiscal) year.

Annual Report

Seattle Municipal Street Railway

The statement of income of the Seattle (Wash.) Municipal Street Railway for the year ended Nov. 30, 1916, follows:

Passenger revenue	$33,651
Freight revenue	9,139
Miscellaneous revenue	2,785
Total revenues	$45,575
Way and structures	$6,530
Equipment	2,330
Power	12,946
Passenger conductors and motormen	18,993
Freight conductors and motormen	2,622
Car house employees	4,949
Other transportation employees	750
Other transportation expense	981
Traffic	...
General and miscellaneous	5,886
Total expenses	$55,988
Operating deficit	$10,413
Interest on bonds	19,125
Total deficit	$29,537

The total revenues during 1916 showed an increase of $9,160 or 25 per cent over those of the preceding year, and the operating expenses fell off $4,084 or about 7 per cent. The passenger total in the last year was 699,430 and the number of car miles run 317,345 for passengers and 12,750 for freight. On Division "A" the passenger revenues per car mile in 1916 were 12.13 cents and the expenses 14.49 cents, as compared to 11 cents and 19.02 cents in the preceding year, while on Division "C" the passenger revenues were 10.81 cents and the expenses 19.18 cents, as compared to 10.07 cents and 18.03 cents in 1915, and the freight revenues were 71.68 cents and the expenses 20.57 cents as compared to 47.15 cents and 20.51 cents the year before.

According to the annual report of the department of public utilities of the city of Seattle for the year ended Nov. 30, 1916, from which the foregoing statement is taken, the passenger business on Division "C" did not increase during the last year; in fact, the Sunday travel dropped off considerably. The unusually cold and backward summer had a good deal to do with it, but the increased number of automobiles had a marked effect upon the revenue of the line. Division "C," however, prospered more than Division "A," owing to an increase in freight business. Paving material for the Seattle-Des Moines highway was hauled over the company's lines from May until September and increased the revenue by $3,000. Another big factor in increasing freight revenue was a log-hauling contract which was begun in July and will continue probably until spring. The revenue derived from this source will probably be between $5,000 and $6,000.

According to Superintendent A. L. Valentine, the receipts of Division "C" for the last year were greater than ever before, and a profit was shown for several months, but this is only a temporary improvement depending upon an unusually large amount of freight business. To attain a stable and profitable revenue for this line, the territory served must become more thickly populated. With the enormous increase in industrial activity now centering around the east and west waterways, it is said that the Lake Burien territory should build up accordingly, but it will not get its full share until the car line has been run into the city.

Relief for the Boston Elevated

Partial relief, at least, for the Boston (Mass.) Elevated Railway, is forecasted by an informal vote of the special investigating commission at a meeting during the week ended Jan. 6 in anticipation of a report due soon for presentation to the 1917 Massachusetts Legislature. The board is known to favor returning to the company the $500,000 guarantee deposited with the State twenty years ago to insure the property damages accruing from the building of the elevated lines in Boston. The commission agrees with the company that the necessity for this deposit has passed. The board also favors the public ownership of the Cambridge subway, but will probably leave to the Legislature the question whether it is to be purchased by the State or by the city. Inclosed transfer areas are also favored by the commission with no specification as to their locations. These are to be left to the discretion of the company, subject to the approval of the Massachusetts Public Service Commission or the Boston Transit Commission, as the Legislature may determine. The report will probably include discussions of increased rate of fare and reduced taxation, but the views of the commission upon these topics are not available at this writing except that the likelihood of fare unit increase recommendations may be considered doubtful at this time.

The Boston Chamber of Commerce is now considering a report of its public utilities committee on the company's financial situation, among the signers being Russell Robb of the firm of Stone & Webster, John E. Oldham of Merrill, Oldham & Company, and also Hammond V. Hayes, a rate and engineering expert of the New England Telephone & Telegraph Company, Boston. This report favors relief which will increase the net revenue of the company; advocates an increase in fare if no other adequate relief can be obtained; holds that the purchase of the Cambridge subway by the State may be helpful but does not meet the basic need of the system; opposes city or state contributions; favors the elimination of certain paving burdens and the inclosing of transfer areas or reduction of certain free transfer facilities. The report points out that when the city or state contributes toward the expense there is no automatic rectifying force, the contribution being general and quickly forgotten, while a contribution in the form of fares is personal, and automatically creates an interested and watchful body of critics, between whom and the company the Public Service Commission must sit in judgment.

San Francisco Deposit Time Extended

Two Committees, One Eastern, the Other Western, Seek Deposit of United Railroad's 4 Per Cent Bonds

The committee of bankers of San Francisco, Cal., which has put forth a reorganization plan for the United Railroads of San Francisco, has issued a circular to holders of the 4 per cent bonds stating that up to Jan. 1 there had been deposited with the committee $9,500,000 of the bonds from 900 bondholders. The committee has extended the time for deposit of the bonds to Jan. 31 and announces that unless a majority of the 4 per cent bonds has been deposited by that date the committee will feel compelled to abandon the plan, return the deposited bonds and retire from further connection with the re-organization of the company.

Meanwhile a new committee composed of Baltimore, Philadelphia and New York men has been formed and is asking for deposit of the bonds in opposition to the San Francisco plan. This committee is headed by John Henry Hammond of Brown Brothers & Company, New York, as chairman. Other members of the committee are Donald G. Geddes, of Clark, Dodge & Company, New York; B. Howell Griswold, Jr., of Alexander Brown & Sons, Baltimore; A. H. S. Post of the Mercantile Trust & Deposit Company, Baltimore, and Edward B. Smith of Edward B. Smith & Company, Philadelphia.

The San Francisco committee states that it is convinced that, under existing conditions, a more favorable plan for the bondholders cannot be made, and that if its plan be abandoned, foreclosure suit will follow and the bondholders will be compelled to contend for their rights in the courts. It calls attention to the foreclosure proceedings brought on the $1,800,000 of Market Street Cable Railway 6 per cent bonds and says that immediate action by the holders of the 4 per cent bonds is imperative. The committee asserts that it is willing to do all in its power to help get the company out of its difficulties, but unless a majority of the 4 per cent bonds is deposited by Jan. 31, it will give up its plan as it will be unable to proceed further.

Brooklyn (N. Y.) City Railroad.—At the annual meeting of the board of directors of the Brooklyn City Railroad, on Jan. 9, Frank Lyman was re-elected president of the company and Z. E. Watson was re-elected secretary and treas-

urer. Henry F. Noyes was elected vice-president to succeed Richard L. Edwards, who had been vice-president of the company since Jan. 14, 1908. The Brooklyn City Railroad is operated under lease by the Brooklyn Rapid Transit Company.

Detroit (Mich.) United Railway.—As noted in the ELECTRIC RAILWAY JOURNAL for Dec. 30, 1916, page 1365, the stockholders of the Detroit United Railway will take action at the annual meeting on Feb. 6 on the recommendations of the board of directors to increase the capital stock of the company from $12,500,000, all outstanding, to $25,000,000, to provide from time to time for funds necessary for the acquisition and construction of additional lines of railway, the purchase of rights-of-way, equipment, etc., for the growth and development of the property. In a supplementary notice to the stockholders F. W. Brooks, president of the company, announces that with the authorization of the additional issue the management will recommend that during 1917 there shall be issued $2,500,000 of the new stock for the purposes mentioned and that stockholders shall receive the right to purchase the same at par in proportion to their holdings of the present stock.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—The Bloomington & Narmal Railway & Light Company, controlled by the Illinois Traction Company, has filed at Springfield notice certifying to an increase in the capital stock of the company from $1,650,000 to $1,900,000. The company is reported unofficially to have $1,200,000 of common stock and $450,000 of 6 per cent cumulative preferred stock outstanding at present.

El Paso (Tex.) Electric Railway.—The El Paso Electric Railway has filed an amendment to its charter at Austin increasing its capital stock from $2,500,000 to $3,500,000. The proceeds of the $1,000,000 of additional capital will be used for additions and betterments.

Georgia Railway & Power Company, Atlanta, Ga.—Payment of accumulated dividends at 6 per cent for the years 1913, 1914, 1915 and 1916, or 24 per cent total, on the company's first preferred cumulative 6 per cent stock issue of $2,000,000 was authorized on Dec. 28 by the directors of the Georgia Railway & Power Company. This payment was ordered to be made to all stockholders as of record at the close of business on Jan. 5, as follows: $60,000 in cash on Jan. 15, and $420,000 in company non-interest bearing scrip to be delivered also on that date and to be payable $30,000 semi-annually for the ensuing seven years, beginning on July 1, 1917. The issuance of the scrip is subject to the approval of the Georgia Railroad Commission, which has been petitioned formally for that approval and will hear the petition on Jan. 11. A statement issued by the company with the announcement of this action invited attention to the fact that following the payment on Jan. 1, 1913, of the 6 per cent preferred dividend accrued at that date in the several months since the company's organization, heavy demands were made upon the company for the expenses of construction and other new work in the development of its water-power properties. All earnings were diverted to meet those demands, which ceased some months ago when the company completed the building of its foundations. It is regarded as probable that the cumulative dividends on this first preferred stock will be paid hereafter by the company annually as they fall due. Application for authority to issue $283,000 par value of refunding and improvement forty-five 5 per cent bonds has been filed with the Georgia Railroad Commission by the Georgia Railway & Electric Company. The petition will be heard on Jan. 11. The bonds are to cover additions and improvements made during 1916. The Georgia Railway & Power Company has petitioned the Railroad Commission for authority to issue $459,000 par value of first and refunding mortgage bonds to reimburse the treasury for cash advanced for the acquisition and improvement of new properties. The commission will hear the matter on Jan. 11.

Kansas City (Mo.) Railways.—The Kansas City Railways has bought in the Kansas City Elevated Railway for $260,000 and the Kansas City & Westport Belt Railway for $100,000. They were auctioned off from the court house steps by Rush C. Lake, one of the federal court commissioners in the settlement of the receivership of the Metropolitan Street Railway, the predecessor of the Kansas City Railways. The sale is a mere form resulting from the receivership.

Kentucky Securities Corporation, Lexington, Ky.—An extra dividend of 1 per cent has been declared on the $2,154,920 of preferred stock of the Kentucky Securities Corporation on account of accumulations, along with the regular quarterly 1½ per cent, both payable on Jan. 15. This disposes of all the accumulated dividends on this issue.

Minster & Loramie Railway, Ft. Loramie, Ohio. — The First National Bank, New Bremen, Ohio, has filed an action in Common Pleas Court asking that a receiver be appointed for the Minster & Loramie Railway. The action states that in the October term of court in 1916, the plaintiff received a judgment for $1,083, which has not been paid. The bank is the owner of bonds of the railway of a total par value of $20,000, constituting the entire bonded indebtedness of the company. These bonds are dated July 1, 1914, and are secured by a first mortgage. The bank says that the railroad is in default of the payment of interest on the bonds since July 1, 1915. The bank also owns eighty-seven shares of stock of a par value of $100 each.

New York State Railways, Syracuse, N. Y.—The directors of the New York State Railways have reduced the common stock dividend from 1¼ per cent to 1 per cent quarterly. Last April the dividend was increased from 1 per cent quarterly to 1¼ per cent.

Norton, Taunton & Attleboro Street Railway, Norton, Mass.—The Massachusetts Public Service Commission has authorized the Norton, Taunton & Attleboro Street Railway, the successor to the Norton & Taunton Street Railway, to issue $120,000 of capital stock.

Omaha, Lincoln & Beatrice Interurban Railroad, Lincoln, Neb.—The Omaha, Lincoln & Beatrice Interurban Railroad has been authorized by the Nebraska Railroad Commission to issue $2,000,000 of common stock and $500,000 of preferred stock and $2,500,000 of bonds for building and completing its line from Omaha to Lincoln.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has issued a statement concerning the arrangement with local banks under which they have agreed to purchase the coupons due in January and in default. The company said: "This company was unable to pay, on their due date, coupons of the San Francisco-Oakland and San José Consolidated Railway, maturing Nov. 19, 1916, and will likewise be unable to pay, on their due dates, the various coupons maturing during the month of January, 1917. Actuated by a desire to preserve the status of the company's securities, pending the outcome of efforts to bring about a franchise resettlement, certain San Francisco and Oakland banks have again offered, as a matter of accommodation to bondholders desiring to cash their coupons at the respective due dates, to purchase these coupons at the full face amount thereof, less income tax, provided they are accompanied by a bill of sale similar to that used last July, such bill of sale being necessary, in the opinion of the attorneys for the purchasing banks, to protect moneys advanced by them. The banks joining in this advance consist of the Anglo & London Paris National Bank, the German Savings & Loan Society, Mercantile National Bank of San Francisco, Savings Union Bank & Trust Company, Central National Bank, Oakland; the Oakland Bank of Savings and the First National Bank, Oakland."

Scranton (Pa.) Railway.—The American Railways has elected to purchase at 102½ and interest on March 1 all of the outstanding $1,500,000 of 5 per cent preferred stock gold trust certificates of the Scranton Railway due in 1935.

Sherbrooke Railway & Power Company, Sherbrooke, Quebec.—The Southern Canada Power Company, Ltd., Drummonsville, Quebec, has offered to take over 51 per cent of the capital stock of the Sherbrooke Railway & Power Company, proposing to increase its own capital stock and create a 6 per cent preference stock, cumulative from Jan. 1, 1920. One share of this preference stock will be given in exchange for four shares of the capital stock of the Sherbrooke Railway & Power Company. If this is acceptable to the shareholders control will be transferred immediately. It is reported that shareholders holding about

one-fourth of the capital stock of the Sherbrooke Railway & Power Company have signified their intention of accepting the offer.

Springfield Terminal Railway & Power Company, Springfield, Ohio.—Warner & Fitzharris, Philadelphia, Pa., are offering with C. W. Anderson & Company, Chicago, Ill., $250,000 of first mortgage 6 per cent serial gold bonds of the Springfield Terminal Railway & Power Company, the successor to the Springfield, Troy & Piqua Railway. The proceeds of the bonds will be used to fund floating indebtedness. They will be the new company's only indebtedness. The total authorized issue is $350,000. The bonds are dated Dec. 1, 1916, and mature serially, the last maturities ($50,000) being in 1926. The remaining bonds can be issued only for betterments and additions to the extent of 85 per cent of their cost.

Dividends Declared

Central Illinois Public Service Company, Mattoon, Ill., quarterly, 1½ per cent, preferred.

Chicago (Ill.) Railways, 2 per cent, participating certificates, series 2.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred; 1 per cent preferred on account of accumulated dividends.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Pacific Gas & Electric Company, Sacramento, Cal., quarterly, 1½ per cent, common.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 75 cents, preferred.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Nov.,	'16	$73,298	*$41,330	$31,968	$18,408	$13,560
1 "	"	'15	65,711	*33,353	32,358	17,624	14,734
12 "	"	'16	823,553	*453,550	370,003	213,869	156,134
12 "	"	'15	787,035	*395,785	391,250	212,351	178,899

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m.,	Nov.,	'16	$80,136	*$72,091	$8,045	$27 550	††$19.277
1 "	"	'15	72,855	*62,253	10,602	16,786	††5 956
5 "	"	'16	454,186	*369,025	85,161	138,456	††52,343
5 "	"	'15	425,640	*321,885	103,755	84,526	††20,059

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m.,	Nov.,	'16	$35,957	*$21,316	$14 641	$11,649	$2,992
1 "	"	'15	33.940	*16,844	17,096	11,096	6,000
11 "	"	'16	426,104	*241,786	184,318	125,691	58,627
11 "	"	'15	392,346	*211,860	180,486	120,938	59,548

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m.,	Nov.,	'16	$316,468	*$184.587	$131,881	$42,862	$89,019
1 "	"	'15	277 008	*154,959	122,049	41,197	80.852
12 "	"	'16	3.500.760	*2,069.138	1,431,622	513,997	917.625
12 "	"	'15	3,091,422	*1,833,337	1,258,085	475,142	782.943

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	Nov.,	'16	$1,510.666	*$860,290	$650 376	$426.081	$224,295
1 "	"	'15	1,323.673	*674,794	648,879	403,980	244,899
12 "	"	'16	16,705,218	*9,064,088	7 641,130	5.020,444	2.620,686
12 "	"	'15	14,317,036	*7,599,095	6,717,941	4,428,639	2,289,302

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m.,	Nov.,	'16	$450,652	*$346,949	$103,703	$119.161	††$14.499
1 "	"	'15	417,448	*332,972	84,476	120.461	††34,387
5 "	"	'16	2,601.745	*1,815.365	786 380	601,994	‡217.628
5 "	"	'15	2,315,598	*1,696,815	618,783	602,135	‡49,925

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	Nov.,	'16	$479 367	*$242,563	$236,804	$182.115	$54,689
1 "	"	'15	455,165	*250,683	204,482	182,363	22,119
12 "	"	'16	5,453,455	*3,035,833	2,417,622	2,177,998	239 624
12 "	"	'15	5,542,900	*3,073,832	2,469,068	2,208,504	260,564

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m.,	Nov.,	'16	$14.063	*$17,211	$3,148	§$2.018	††5,138
1 "	"	'15	19,847	*21.425	1,578	§1,723	††3.271
5 "	"	'16	92.436	*98 772	6,336	§9,455	††15.657
5 "	"	'15	116,228	*109,218	7,010	§8,116	††957

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

Ruling in Toilet Case

Pennsylvania Commission Decides That No General Order Be Issued—Specific Complaint Dismissed

The Public Service Commission of Pennsylvania at Harrisburg, Pa., on Jan. 8 handed down a decision in which it is declared that no general order should be made requiring the placing of toilet facilities in the cars of interurban lines. Several months ago the commission called a special conference of the representatives of the electric railways of Pennsylvania at Harrisburg to consider the question of whether a general order or special regulations affecting special cases should be issued. The general opinion of the officers of the railways was that a general order would work a great hardship upon all interurban railways since no two companies operated under exactly the same conditions. In the opinion of the Public Service Commission of Pennsylvania this viewpoint is upheld.

The case upon which the ruling is made is that of James M. Maurer, Reading, against the Oley Valley Railway. Mr. Maurer is a member of the Pennsylvania Legislature and president of the Pennsylvania Federation of Labor, in politics a Socialist and the only member of that party in the General Assembly of the Keystone State. His complaint was in effect that the company and other interurban railways fail to furnish their patrons with proper toilet facilities. He asked for a general order directed against all interurban railways in the State. In the particular case under consideration, in addition to refusing to issue a general order, the complaint against the Oley Valley Railway is dismissed.

The opinion of the commission, written by Commissioner John S. Rilling, is as follows:

"The respondent, the Oley Valley Railway, operates an interurban electric railway from Reading to the Borough of Boyertown, in Berks County, a distance of about 23 miles, its cars making a trip each way every one and one-half hours on week days and every hour on Sundays and holidays. The running time between terminals is one hour and twenty minutes.

"The territory through which the respondent operates is thickly populated and a rich agricultural district. The railway operates on a 5-cent basis and less than 10 per cent of its patronage is through traffic.

"The complaint is that the respondent and other interurban railways fail to furnish their patrons with proper toilet facilities, and asks for a general order directed against all interurban railways in this State.

"It appears that some interurban railways in Pennsylvania already have their cars equipped with proper toilet facilities.

"The subject matter of this complaint is one of importance to the public and good reasons may be urged in favor of the order asked for.

"After due consideration we have reached the conclusion that no general order should be made for the reason that no two interurban railways operate under the same conditions. The length of the route, the running time, the territory traversed, the amount of and character of travel, the density of the population as well as many other facts must all be considered.

"We are of the opinion, considering the length of the respondent's route, its running time, the amount and character of its traffic, the benefits to be derived as well as the inconvenience that would result from an order as asked for, that the complaint in the case under consideration should be dismissed."

An order attached to the opinion dismissed the complaint as of Jan. 8, 1917.

The testimony at the conference at Harrisburg on Nov. 17 on this matter was summarized in the ELECTRIC RAILWAY JOURNAL of Nov. 25, 1916, page 1129.

B. R. T. Starts Efficiency Campaign

A joint efficiency campaign of the men and management of the Brooklyn (N. Y.) Rapid Transit System has been inaugurated on approval of President T. S. Williams.

This campaign, which is described by S. W. Huff, vice-president of the company, in the *B. R. T. Monthly* for December, includes practically all departments where men are employed in large numbers and the plans which are now nearing completion will extend these educational efforts to the surface transportation department, the New York Consolidated Railroad, operating the rapid transit lines, the department of way and structure, the mechanical department and the electrical department.

The object of the educational program will be to make each individual employee realize how his personal efficiency in the performance of his duties can contribute to his own standing and prospects, to the prosperity of the company and to the service which the public receives. Each individual will be reminded of certain definite matters covered by outstanding rules and regulations in which personal efficiency results in a direct gain in net earnings, and the lack of it makes equally certain not only loss to the company, but loss of his own standing in the company service.

The joint efficiency campaign is the outcome of studies which have been made by a special committee on increased net earnings appointed several weeks ago by Colonel Williams.

Because of the wide variety of operations which have to be conducted in the Brooklyn Rapid Transit System, each department proposing to participate in the joint campaign is working out the educational methods best suited to its conditions. In general, however, the educational work will be based on a series of bulletins in each participating department, taking up and explaining a number of the rules and regulations of such department in which the attainment of increased individual efficiency means increased net earnings for the company.

Jitney Matters in Portland

According to a decision of four members of the City Council of Portland, Ore., no franchise will be granted the Union Motor Bus Company to operate jitneys in that city unless the company accepts routes over streets on which there are no street railway lines. This means that the company, which is composed of more than 200 of the owners of jitneys in Portland, must meet the terms of the Council or go out of business.

The Council outlined a proposed standard zone system, governing the charges for taxicabs, which operate under the zone system. This system will supplant the one prepared by Commissioner Daly, which did not meet with the approval of the other members of the Council. Commissioner Daly's plan would permit the taxi-jits to operate on a 5-cent basis on the old jitney routes. Under the new scheme, it is hoped to prevent taxi-jits from operating on a 5-cent fare basis, forcing the operators to take out a jitney franchise, or cease operation. There will be a dozen or fourteen zones in the entire city, while under Mr. Daly's plan the city was divided into 108 zones.

The Portland Trackless Car Company, a subsidiary of the Portland & Oregon City Railway, has filed an application for a franchise to operate jitneys on four additional routes. This makes eight routes for the operation of jitneys sought by this company. It is proposed to make this jitney line a feeder for the Portland & Oregon City Railway and to give transfers from one line to another.

The Council of Portland is considering the granting of a franchise to W. M. Foster for the operation of a line of jitneys between Portland and Linnton. The applicant agrees to pay the city $50 a quarter for each car, and provide a bond of $10,000 to idemnify the city or the public against damage or loss. A 10-cent fare will be charged on account of the long haul, and ten passenger cars will be operated. The Union Motor Bus Company has announced that it will apply for a franchise over the same route.

Because Commissioner Daly of the Department of Public Utilities of Portland, Ore., refused to approve the proposed "standard" zone system, prepared by Commissioner Dieck, to govern the operation of taxicabs and taxi-jit, Mayor Albee has taken away the supervision of all transportation utilities and all franchise matters, and the administration of all ordinances relating thereto, from Commissioner Daly and transferred this authority to Commissioner Dieck.

Service Improvements in Harrisburg

Extensive plans for service improvement on the lines of the Harrisburg (Pa.) Railways were announced on Jan. 1 by Frank B. Musser, president of the company. Changes in schedules giving more frequent service are being arranged, and on Dec. 30 a contract for ten new cars was placed with The J. G. Brill Company, Philadedphia, Pa. The first of these will be delivered during the latter part of May and will probably be used for the first time on Memorial Day. Five of the new cars will be of the all-steel type, similar to the 800 series recently placed in service. These will be used on the suburban lines. The other five will be for city lines and will be similar to the 600 series with longitudinal seats.

Mr. Musser intimated that other changes may be expected in the near future, and said that men are being stationed at congested street intersections to study how traffic conditions can be bettered so that cars can be kept on schedule during the busy hours of the day. Action on further improvements will probably be taken at the annual meeting of the board of directors to be held in March. Work has been started on remodeling and repairing some of the special cars used in the morning and evening to haul the workmen to and from Steelton.

New Company Publication in Baltimore

The United Railways Forum is the title of a new monthly employees' magazine prepared by the United Railways & Electric Company, Baltimore, Md., the first issue of which is dated Jan. 1. The new periodical is introduced in a foreword by W. A. House, president of the company, the theme of which is embodied in the slogan of the company that "The United spirit stands for safe service, courteous service, efficient service." The plan of the new magazine is to print articles upon various phases of the street railway work; the local problems which the company is called upon to face and the means for their solution. It will also devote liberal space to the recreation activities and personal news of the employees and their families. The leading article of the first issue describes the extensive task now being undertaken by the railway, of remodeling 560 semi-convertible, double-truck cars of the open platform type into modern vestibule pay-as-you-enter cars, an illustrated account of which was also contained in the ELECTRIC RAILWAY JOURNAL of Aug. 19, 1916.

Railway Participates in Safety-First Parade.—An active part was played by the Nashville Railway & Light Company, Nashville, Tenn., in a "Safety First" parade held in Nashville on Dec. 4. In addition to the display furnished by automobiles in the parade, many of the street railway cars were decorated on the sides with "Safety First" signs and brilliantly illuminated, while other cars were used as floats.

Commission Refuses to Modify Additional Service Order in Lemoyne, Pa.—The Public Service Commission of Pennsylvania in a ruling on Jan. 8 refused a modification of an order in which additional cars on the Harrisburg-Marysville line of the Valley Railways, Lemoyne, Pa., were ordered. The company asked to be relieved of the order because it was declared additional cars were not sufficiently patronized to make them profitable.

Illustrated Safety-First Advertisements in Toledo.—A series of advertisements embodying illustrated talks to automobile drivers has been recently published by the Toledo Railways & Light Company, Toledo, Ohio, in the Toledo newspapers. The illustrations are reproduced from posed photographs showing the common forms of collisions and accidents in Toledo, such as driving past a standing street car, reckless driving on corners, going on the wrong side of the street, careless parking, etc.

More Than Ten Years Without Loss of Life to a Passenger.—The Portland Railway, Light & Power Company, Portland, Ore. calls attention in *Watts Watt*, distributed among its patrons to the fact that not a single passenger has lost his life while riding on one of its cars in the nearly ten years since the company took over the operation of the street railway business in Portland. From Jan. 1, 1907, up to and including Nov. 30, 1916, a period of nine years and eleven months, a total of 810,363,205 persons has been carried.

Jitney Privileges Denied to Minors.—The Public Service Commission of Pennsylvania has refused to grant a certificate of public convenience to operate a jitney to persons under twenty-one years of age. This decision, which will govern in future applications, was made in the cases of applicants from Mifflin and Juniata counties and was reached after an exhaustive inquiry. The applicants had bought an automobile and desired to establish a jitney line, but the commission held that such operators should be twenty-one years of age.

Reprisals Against I. T. S. in Venice.—The City Council of Venice, Ill., on Jan. 5 repealed the ordinances granting franchises to the Illinois Traction Company and instructed the superintendent of streets to notify the company to remove its tracks within five days. The franchises, according to the city attorney, provides for a 5-cent fare from any part of Venice to any part of St. Louis. The company on Dec. 29, under authority from the Interstate Commerce Commission, made the fare 5 cents from the southern limits of Venice and 10 cents from any other part of the town.

Kansas City Railways Making Traffic Study.—Ross W. Harris, consulting engineer of Madison, Wis., whose appointment by the Kansas City Railways to make a study of the traffic conditions there was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1916, has twenty-eight men employed in making an accurate count of the passengers handled on the various lines, and this count will be continued until the passengers handled on every trip on all lines in the city are recorded. These checkers ride the cars and record the number of off and on passengers at every stop.

Toledo Company Starts Advertising School.—With a view to broadening the knowledge of members of the new business department of the Toledo Railways & Light Company, Toledo, Ohio, a school in advertising has been formed to run through the month of January. Meetings will be held every Monday night, the first on Jan. 8. On this day the men will turn in ads they have written and these will be criticized and suggestions made by E. R. Kelsey, advertising manager of the company. Practical talks from different members of the Toledo Advertising Club will be a feature of the course.

Railroad Commission Asks Rehearing on Jitneys.—The Railroad Commission of California has petitioned the Supreme Court of that State for a rehearing on the court's decision which recently put certain classes of jitney buses and automobile trucks under the commission's jurisdiction. The court is asked to declare the commission's jurisdiction limited to rates and systems of accounts, and to cover only jitney buses and auto trucks which operate as common carriers on regular schedules over public highways between fixed points, one of which points is in a municipality and the other outside the municipality. The commission asks that the court make this declaration either after a rehearing or by a modification of its decision of Dec. 14, 1916.

School Passes Revoked Outside City Limits.—Although the anti-pass law, enacted at the last session of the Kentucky Legislature, became effective on Jan. 1, under the terms of which it had seemed apparent that half-fare privileges now extended to teachers and pupils of the public schools would be curtailed in part, the Louisville (Ky.) Railway will continue to give preferential rates to all pupils and teachers inside the city limits. In the county outside of the city pupils in public and parochial schools will continue to ride for half fare, the law providing for this concession, but pupils in private schools and all teachers in all schools will be required to pay full fare. The concessions are made possible inside the city by provisions in the original charters issued to railways in Louisville.

Conference on Buffalo Fare Case.—Counsel representing the International Railway, Buffalo, N. Y., has agreed to confer with Corporation Counsel Rann regarding the application which will be made by Mr. Rann to the Public Service Commission for an investigation into the rate of fare and charged by the company over its Buffalo city lines. The corporation counsel is making an effort to have the commission order a reduction in fare from 5 cents to 4 cents. It is the desire of the city attorneys to effect a stipulation with the Internationl Railway over the question of having the law settled as to the jurisdiction of the commission in the proposed rate investigation. The company will contend that the commission has no authority in the matter of reducing the rate of fare.

Baltimore Car-Full Measure a Failure.—The Baltimore *Star*, in commenting in its issue of Jan. 5 on the car-full order in that city, said: "Under the car-full rule of the Public Service Commission of Maryland the United Railways & Electric Company was ordered to adhere to a carrying limit for each line of cars, the limit to be fixed by the commission. For several months this rule has been tried and, though there have been efforts on the part of the company to carry it out, it has been found not to have worked successfully under existing conditions. The net result at rush hours, especially during the recent Christmas shopping season, was to force hundreds of people to wait on every downtown street in good weather and bad until cars reached them which were not carrying the maximum number of passengers. This condition was violently protested to the commission by citizens of all sections of the city, and the first real test of the car-full line was virtually pronounced a failure. This through the action of the commission in suspending the order from nearly a week before Christmas until Jan. 1."

Washington & Old Dominion Claims to Be Interstate Carrier.—That the Washington & Old Dominion Railway, Washington, D. C., is an interstate carrier, under the jurisdiction of the Interstate Commerce Commission, is contended in a brief filed with the commission on Dec. 16 by Wilton J. Lambert, general attorney for the company. The brief was filed in connection with a certain case against this company and the Capital Traction Company, involving the question of transfers between the two car lines at Thirty-sixth and M Streets, northwest. The particular point now under consideration by the commission is the question of jurisdiction. It is pointed out in the brief of the company that the line enters Washington over an interstate bridge, has joint and through freight rates with steam railroads, handles express and uses both electricity and steam for locomotion, files its tariffs with the Interstate Commerce Commission and complies with the commission's safety requirements and other regulations. For the above reasons it is contended that the Public Utilities Commission of the District of Columbia cannot be considered to have any jurisdiction over the issues involved in this case regarding the railway.

Street Railway Line Has Right of Way.—The Supreme Court of New Jersey has handed down a decision covering the status of street railways with regard to the State traffic act of 1915 for street vehicles. This measure provides that drivers of vehicles approaching the intersection of a street shall grant the right of way to any vehicle coming from the right. The court holds that such requirement does not apply to motormen on electric railways, reversing a decision of a lower court. The action at issue was brought by a resident of Jersey City for damages against the Public Service Railway. While driving an automobile from an intersecting street east into Monticello Avenue the man who brought suit was struck by a car moving south along such thoroughfare. The lower court decided that the motorman was bound by the provisions of the traffic act and was in error in not giving right of way to the automobile. In reversing this ruling the Supreme Court decided that the traffic measure cannot be held as applicable to street railway lines. It is pointed out that elsewhere in the act drivers of vehicles are directed as to the course to be taken in passing other vehicles, turning corners and, in certain circumstances, veering from one part of the roadway to another. The court said that it is evident that such provisions in the act could not have contemplated street cars, specifically excluding with such considerations electric railway lines.

Hugh M. Wilson Retires

Resigns as First Vice-President of the McGraw Publishing Company Inc.

Hugh M. Wilson, first vice-president of the McGraw Publishing Company Inc., has tendered his resignation and will devote himself to his personal interests. Mr. Wilson has been vice-president of the McGraw company for the past six years, during which time the organization has grown constantly in strength. Two new papers, *Electrical Merchandising* and *The Contractor* have been purchased, *Metallurgical & Chemical Engineering* has been changed from a monthly to a semi-monthly, and the other properties, ELECTRIC RAILWAY JOURNAL, *Electrical World* and *Engineering Record* have made rapid progress.



HUGH M. WILSON

Before joining the McGraw staff, Mr. Wilson had long been a prominent figure in the field of technical journalism, and from 1899 to 1908 was president and chief proprietor of the *Railway Age*. During 1905, the International Railway Congress met at Washington, D. C., and Mr. Wilson offered to publish a daily issue of the *Railway Age* with the papers and a report of each session printed in both French and English. The offer was accepted and the paper was designated as the official journal of the congress. It was a tremendous task from a journalistic standpoint, but through the energy of Mr. Wilson and his staff it was carried out successfully and brought great prestige to the paper and its publishers. In recognition of Mr. Wilson's contribution to the success of the convention through the publication of this daily, he was created a chevalier of the order of Leopold by the King of Belgium.

In 1908 Mr. Wilson sold his interest in the *Railway Age* to the publishers of the *Railroad Gazette*, with which it was consolidated under the name of *Railway Age-Gazette*. At the time of this sale Mr. Wilson also sold his interests in the *Electric Railway Review*, which he had owned for about two years, to the McGraw Publishing Company.

After disposing of these papers Mr. Wilson went abroad for an extended trip and on his return in June, 1909, was elected director and vice-president of the Barney & Smith Car Company of Dayton, Ohio. Mr. Wilson continued with the Barney & Smith Car Company until 1910 and was then elected first vice-president of the McGraw Publishing Company, which position he has just relinquished.

Mr. Wilson's work as a publisher has been marked by his devotion to the highest standards possible, and he has the happy faculty of being able to create in his associates a like enthusiasm and desire to put forth their best efforts. As a writer he combines the qualities of being a keen observer of men and events and ability to express his ideas clearly and convincingly. To these journalistic gifts he added the broad foundation of a long experience in the daily and technical newspaper field. In fact, most of his life, following his graduation from Illinois College in 1887, has been spent in that business.

His first newspaper engagement was as city editor of the Jacksonville (Ill.) *Daily Journal*, but desiring wider experience he went to Minneapolis and accepted a position there as a reporter on the *Evening Star*. That change placed him in touch with the technical journal field, and recognizing its possibilities, he joined the staff of the *Mississippi Valley Lumberman* in 1889. In May, 1891 he changed his desk again to become associate editor of the *Northwestern Railroader* and thus began his career as the railroad journalist. On Sept. 15, 1891, his paper was combined with the *Railway Age*, and he became secretary and treasurer of the consolidated paper. Subsequently he was made manager, and in 1899 he was elected president.

Personal Mention

James Hawson has been elected vice-president of the Trans-St. Mary's Traction Company, Sault Ste. Marie, Ontario.

W. L. Hogarth has been appointed purchasing agent of the Trans-St. Mary's Traction Company, Sault Ste. Marie, Ontario.

G. W. Cook has been appointed engineer of overhead construction of the Central Illinois Public Service Company, Mattoon, Ill.

R. R. Alexander has been elected secretary and treasurer of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.

William G. Henshaw has been elected president of the Glendale & Montrose Railway, Glendale, Cal., with office in San Francisco.

Ernest Claxton has been appointed chief engineer and master mechanic of the Fairfax Incline Railroad, with office at Fairfax, Cal.

J. W. Cheney has been appointed claim agent of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C.

G. Stewart has been elected president of the Grand River Valley Railway, Grand Junction, Col., succeeding E. A. Sunderlin, resigned.

Fred Bredlan has been appointed engineer of power station of the Northwestern Ohio Railway & Power Company, at Port Clinton, Ohio.

James Curry has been appointed power station engineer of the West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa.

J. H. Brooke, of the schedule department of the Detroit (Mich.) United Railway, has been appointed assistant car accountant of the company.

W. H. Fisher, formerly vice-president of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., has been elected president of the company.

G. M. Simmons has been appointed master mechanic and engineer of overhead construction of the Orange County Traction Company, Newburgh, N. Y.

Henry Gale has been appointed superintendent of the street railway operating department of the Freeport Railway & Light Company, Freeport, Ill.

W. S. Easton has been appointed auditor of the Glendale & Montrose Railway and the Riverside, Rialto & Pacific Railroad, with office at Riverside, Cal.

W. C. Franz, formerly vice-president of the Trans-St. Mary's Traction Company, Sault Ste. Marie, Ontario, has been elected president of the company.

E. J. Andrews has been elected electrical engineer, signal engineer and master mechanic of the Aurora, Plainfield & Joliet Railway, with office at Plainfield, Ill.

R. E. Cornwell has been appointed purchasing agent of the Chicago, Lake Shore & South Bend Railway, Michigan, Ind., and the Southern Michigan Railway.

Edward K. Hall, vice-president of the New England Telephone & Telegraph Company, has been elected a vice-president of the Electric Bond & Share Company, New York.

R. E. Cornwell has been appointed purchasing agent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, with office at South Bend, Ind.

William Hartz has been appointed auditor of the New York & Long Island Traction Company, Long Island City, N. Y., and the Long Island Electric Railway, Long Island City, N. Y.

L. E. Hollar has been appointed superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, with office at South Bend, Ind.

Julien H. Harvey, superintendent of efficiency of the Kansas City (Mo.) Railways and first president of the Kansas City Local Safety Council, was re-elected president of the Council at the annual meeting on Jan. 8.

Amos A. Betts has been elected a member of the Arizona Corporation Commission. Mr. Betts has had an extensive steam railroad experience dating from 1890. On February 1, 1915, he was appointed rate expert for the Arizona Corporation Commission, which position he held at the time of his present election.

Ray D. Janes has been appointed general claim agent of the Reading Transit & Light Company, Reading, Pa., and affiliated companies, with offices in Reading, Pa., succeeding Rex D. Billings, resigned. Mr. Janes formerly spent six years as assistant claim agent with the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

Clyde Furlong, formerly assistant superintendent of the Flint division of the Detroit (Mich.) United Railway, has been appointed assistant division superintendent in charge of interurbans within the half-mile circle. Mr. Furlong will have charge of the interurban carhouse in Detroit and will direct the operation of the cars from the interurban station.

William A. House, president of the United Railways & Electric Company, Baltimore, Md., on Jan. 3 was voted an indefinite leave of absence by the board of directors. After a month's rest, Mr. House will inspect the street railway systems in a number of the larger cities with the view of meeting the future requirements of the local Baltimore situation. He sailed on Jan. 11 for Cuba and South America.

Frank H. Miller, superintendent of motive power, and Samuel Riddle, superintendent of transportation, of the Louisville (Ky.) Railway, as Rotarians, were hosts to 150 members of the Louisville Rotary Club which paid a visit to the power house to see "what makes the street car go." Special cars were provided to carry the visitors from downtown and a buffet luncheon was provided at the plant.

William H. Dinsmore has been appointed traffic superintendent for the British Columbia Electric Railway Company, Vancouver, the appointment taking effect on Jan. 1. For nine months previous to this appointment he was acting traffic superintendent. Mr. Dinsmore started with the company on Feb. 1, 1901, as a conductor, and was promoted in 1909 to the position of inspector and in November, 1915, was made chief inspector.

Robert M. Feustel, a member of the firm of Sloan, Huddle, Feustel & Freeman, consulting engineers, has been elected president of the Fort Wayne & Northern Indiana Traction Company to succeed J. M. Barrett, recently resigned. Mr. Feustel was graduated from Purdue University in the civil engineering class of 1905, and after about two years in railroad construction work joined the engineering staff of the Wisconsin Railroad Commission. He later severed his connection with that commission to become a member of the above-mentioned firm.

Thornwell Mullally, formerly assistant to the president of the United Railroads of San Francisco, San Francisco, Cal., has received a special invitation from Major General Pershing to join the Pershing column in Mexico for an indefinite period, during which he will study military field tactics and procedure at close range. Mr. Mullally's status will be that of "military observer." Mr. Mullally is a graduate of Yale University and also of the New York Law School. He devoted himself to law work in New York until 1906, when he went to San Francisco. In his position as assistant to the president he rendered invaluable public service in connection with the reconstruction and reorganization of the city's transportation facilities following the fire.

Frank Hammond, editor of the *Buzzer*, the weekly employees' publication of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has resigned this position to go into the automobile business. Mr. Hammond was born in Greenville, S. C., in 1882. After a grammar school education he was employed at seventeen as shipping clerk with the Charleston & Western Carolina Railway, which position he resigned after two years' service to accept a place as freight clerk with the Carolina Supply Company. In 1903 he obtained a position as bookkeeper with the Standard Oil Company in Birmingham, where he remained for eighteen months, resigning to accept a position as salesman with the Birmingham Railway, Light & Power Company in February, 1905. He was subsequently promoted to the position of chief salesman, assistant commercial manager, commercial manager and general agent, which position he held in addition to his editorial work.

George Tracy Buckingham has been appointed counsel for the Illinois State Public Utilities Commission. Mr. Buckingham is a Chicago attorney, and formerly practised in Danville, Ill., for a number of years. While in Danville he was president and chief owner of the Danville Belt Coal Company, was district attorney for the Wabash Railway Company, and general counsel of the Illinois Coal Operators' Association. He also became interested in the various railway properties which have been comprised in the Illinois Traction System, and was connected with many coal mining properties. He was also assistant state's attorney of Vermilion county and in 1907 was a candidate for justice of the Illinois Supreme Court in the republican convention of that year. Since removing to Chicago Mr. Buckingham served as a trustee of the Kankakee State Hospital for the Insane from 1897 to 1901, and president of the Joliet Prison Board from 1901 to 1905. From 1886 to 1904 he was active in the affairs of the Illinois National Guard and attained the rank of colonel.

Thomas A. Cross, vice-president and general manager of the United Railways & Electric Company, Baltimore, Md., has been appointed in temporary charge of the duties of president in the absence of W. A. House, who has been voted an indefinite leave of absence by the board of directors. Mr. Cross is a native of Baltimore and has been connected with the street railways in that city since a young man. His first work was with the North Avenue Electric Railway, the service of which he entered in 1890. This company was succeeded by the Lake Roland Elevated Railway, and Mr. Cross was advanced until in 1893 he was selected by the Baltimore Traction Company to take charge of its overhead work, motor equipment and power stations. When this company was consolidated with the City & Suburban Railway as the Consolidated Electric Railway Mr. Cross's duties were further increased, and in 1899, when all the lines were merged as the United Railways & Electric Company, Mr. Cross was appointed to the position of superintendent of overhead work, cables, etc. In April, 1907, he was appointed general manager of the company and in May, 1911, he was also elected second vice-president.

Obituary

Sir George White, Bart., one of the pioneers of electric tramways in England, died suddenly at Bristol in November last. He was born in Bristol in 1854, and obtained his early education at St. Michael's Boys' School in that city, but before he had been there long he had to go out into the world to earn his living. In 1874 he was appointed secretary of the company which opened the first tramway line in Bristol, but a year later he started for himself as a stockbroker, and so for a time lost touch with the tramway world. Later his efforts were directed to obtaining control of isolated and semi-derelict railway lines, and consolidating them into main-line systems. About 1893, he and his brother, his partner, secured control of the Imperial Tramways Company, and with Sir Clifton Robinson, who had just returned from the United States, promoted extensions in Dublin and Middlesbrough, where the company owned lines, substituted electricity for horsepower, and completely transformed the company both financially and from the point of view of the passengers' comfort. The Bristol Tramways, of which Sir George was successively secretary, managing director, and chairman, was also developed marvellously. The triumvirate of experts next turned their attention to what was then London's need as far as street traction was concerned. They bought up the West Metropolitan Tramways, reconstructed that undertaking into the London United Tramways, and then, after a long and strenuous fight, extending over years, secured for London the benefit of electric traction, and created a great undertaking, from which Sir George retired in 1903.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Globe, Ariz.—The franchise held by the Globe-Miami Traction Company in Globe has reverted back to the city through the action of the City Council. By the terms of the franchise, L. L. Litchfield, president of the company, will receive $1,500 to reimburse him for money expended to interest capital in the project. [June 19, '15.]

***Los Angeles, Cal.**—It is reported that Henry M. Denison, Los Angeles, has asked the Council for a franchise to construct a double-track electric railway on Main Street from Slauson Avenue to Manchester Avenue.

Hartford, Conn.—The Norwich & Hartford Traction Company has asked the General Assembly for an extension of time to 1921 in which to construct its proposed line between Norwich and Hartford.

Peoria Heights, Ill.—The village of Peoria Heights will give a new franchise to the Peoria Railway in place of the one recently revoked by the Village Council. The village will allow the company to place the tracks on the river side of the road instead of in the center, as they are now.

Wilmette, Ill.—The Chicago, North Shore & Milwaukee Electric Railroad has asked the Council for an indefinite extension of its franchise through the village of Wilmette.

Boston, Mass.—The Boston Elevated Railway has filed a petition with the Public Service Commission asking for an extension of time in which to complete the Everett-Malden elevated line.

Tonawanda, N. Y.—The International Railway has made application to the town board of Tonawanda for permission to construct an extension to its line along the River Road from the Grand Island Ferry road to Tonawanda, about 5 miles. The company now maintains a single track line upon which one car is operated from the Buffalo city line at Riverside Park to the Grand Island Ferry Road, about 1 mile. This line will be rebuilt and if the franchise is granted for the extension along the Niagara River to Tonawanda the company will be able to handle the traffic to and from the large industries now under construction along the Niagara River between the Buffalo city line and Tonawanda. The proposed line has already been surveyed and a hearing on the company's application will be held in Kenmore, N. Y., Jan. 20.

Cincinnati, Ohio.—The street railway committee of the City Council has approved an extension of ten years in the franchise for one of the lines of the Interurban Railway & Terminal Company. The franchises of the company will now all expire at the same time.

Dallas, Tex.—Commissioners of Dallas County, on application of E. P. Turner, representing the Dallas Northwestern Traction Company and the Dallas Southwestern Traction Company, granted extensions of twelve months on the franchises recently secured by these companies. The City Commission of Dallas recently extended the franchises six months, although Mr. Turner at that time asked for extensions of one year. [Dec. 23, '16.]

Vancouver, Wash.—The City Council has pledged to give a franchise to the Columbia River Interstate Bridge Commission to construct tracks from the bridge up Washington Street to Second Street, and from the bridge to Main Street on First Street, and up Main Street to Second Street. The Portland Railway, Light & Power Company is to extend the track on Main Street from Second Street to Third Street and lay a third rail down Third Street to Washington Street and down Washington Street to Second Street, thus making a loop around Third Street for both the North Coast Power Company and also the Portland Railway, Light & Power Company.

TRACK AND ROADWAY

Birmingham (Ala.) Interurban Development Company.—It is reported that arrangements have been completed for financing this company's proposed line from Birmingham to Jasper. W. W. Shortridge, Birmingham, secretary. [June 17, '16.]

Mobile, Volanta & Pensacola Railroad, Mobile, Ala.—This company reports that it will construct a line between Gabel and Elberta, 20 miles.

Fort Smith-Oklahoma Light & Traction Company, Fort Smith, Ark.—This company will construct about 1 mile of track during 1917.

Fresno (Cal.) Interurban Railway.—A report from the Fresno Interurban Railway states that it will construct an extension between Academy and Centerville, 10 miles, during 1917.

Montecito Railroad Company, Los Angeles, Cal.—About 1 mile of new track will be built by the Montecito Railroad during 1917.

Pacific Electric Railway, Los Angeles, Cal.—Condemnation proceedings have been filed at Santa Ana by the Pacific Electric Railway preparatory to the construction of a 5-mile right-of-way from La Habra to Fullerton. In the papers filed the company states that it is the intention to build a line to Riverside through Santa Ana Canyon and to build a branch to Santa Ana from La Habra, one of the points in the proposed Riverside line.

***San Francisco, Cal.**—At the request of local steamship operators, James J. Walsh, San Francisco, has prepared preliminary plans for an elevated electric railway along the waterfront from the Channel to Fort Mason, about 2.8 miles, at an estimated cost of $1,120,000.

Connecticut Company, New Haven, Conn.—Petitions have been filed with the State Secretary by the Connecticut Company for permission to construct extensions in Hartford, Waterbury, Bridgeport, New Haven, Meriden, Cromwell, Norwich and Thomaston.

Shore Line Electric Railway, Norwich, Conn.—It is reported that this company contemplates the construction of a line between Westerly and Bradford.

Georgia Railway & Power Company, Atlanta, Ga.—This company will construct about 6 or 8 miles of new track this year.

Aurora, Mendota & Western Railroad, Aurora, Ill.—Construction will be begun in the spring by the Aurora, Mendota & Western Railroad on its proposed line between Aurora and Mendota. One pile bridge, three concrete bridges and five concrete culverts will be constructed. H. D. Hallet, Aurora, chief engineer. [Dec. 23, '16.]

Chicago, Fox Lake & Northern Electric Railway, Chicago, Ill.—This company has received permission from the Illinois Public Utilities Commission for the construction of an extension from Wauconda to Antioch and to the Wisconsin State line. L. K. Sherman, Chicago, chief engineer. [Dec. 2, '16.]

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Board of Public Works has asked the Indianapolis Traction & Terminal Company to construct an extension on Illinois Street from Thirty-ninth Street to Forty-sixth Street.

Western Maryland Railway, Baltimore, Md.—It is reported that the Western Maryland Railway has under consideration the use of electrically-operated trains on its grades over the Blue Ridge Mountains.

***Boothbay, Me.**—It is reported that plans are being made to construct an electric railway from Boothbay to connect with the Lincoln and Knox County branch of the Maine Central Railroad, the cost being estimated at $150,000.

Kansas City, Lawrence & Topeka Electric Railway, Kansas City, Mo.—This company has completed the expenditure of about $20,000 for ballasting and other improvements. It will build immediately 1 mile of track extending the line to Zarah, where a station will be built. The new construction involves a 125-ft. span bridge over Mill Creek, and an overhead crossing over the Santa Fé Railroad, this extension being on the proposed route toward Lawrence, Kan.

Kansas City & Tiffany Springs Railway, Kansas City, Mo.—The Union Mutual Development Company, W. E. Winner, president, which had exploited Tiffany Springs, near Kansas City, and had planned an electric line thereto, is the subject of involuntary bankruptcy proceedings in the Federal Court, the petitioners being the Dwight Building Company, claiming rent due of $585; Mrs. Myra B. Winner, claiming money advanced $1,276.49, and Frances Walton, stenographer, claiming $210. Among the obligations listed in the schedules later filed are about $41,000 in secured notes, bearing on the real-estate project; and $5,892.30 owing variously, including about $800 for engineer's plans and services, and $1,282.71 owing to employees. [Mar. 11, '16.]

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to Lupfer & Remick, Buffalo, N. Y., for the installation of third-rail, track bonding and miscellaneous electrical equipment on the Culver line of the New York Municipal Railway Corporation at $101,000.

Cleveland (Ohio) Railway Company.—Councilman Damm has announced that he will ask for the extension of Wade Park Avenue to East Fifty-fifth Street, in order to reroute the car line on that street over Superior Avenue west from East Fifty-fifth Street. Legislation has been enacted to extend this thoroughfare from East Sixty-first Street to East Sixty-third Street and it is now open between East Fifty-seventh and East Sixty-first Streets. These improvements, with the one to be asked, will straighten the route and make the running time considerably shorter. Councilman W. F. Thompson will ask for the extension of the Union Avenue line from East 112th Street to East 140th Street.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—An extension between Ironton and Hanging Rock, 2 miles, will be built by the Portsmouth Street Railroad & Light Company. All material for the construction has been purchased.

Ardmore (Okla.) Railway.—The Ardmore Railway plans to construct about 30 miles of new line during this year, the extension probably being built northwest from Ardmore.

Oklahoma & Northern Traction Company, Bartlesville, Okla.—W. K. Palmer Engineering Company, Kansas City, has completed the engineering work for the North Division of the Oklahoma & Northern Traction Company system, including 32 miles of track from Columbus, Kan., to Miami, Okla., and a short branch to Baxter Springs, Kan. Construction work will begin soon. Correspondence regarding material and equipment will be handled by the W. K. Palmer Engineering Company. The engineering work on the south division from Miami to Bartlesville, Okla., is also nearing completion and will be ready for construction soon. [Dec. 23, '16.]

Tulsa (Okla.) Traction Company.—The Tulsa Traction Company announces that plans are being formed for installing a street railway system in Tulsa. An interurban line is being projected by the company to extend northward to Collinsville. The company is now building a line from Tulsa to Sapulpa. It is planned to have this line completed and in operation within six weeks.

London & Port Stanley Railway, London, Ont.—The London Railway Commission is considering the construction of 600 ft. of retaining wall to protect the right-of-way in front of the station at Port Stanley from the encroachments of Kettle Creek. The estimated cost of the work is $6,500.

Philadelphia, Pa.—Sealed proposals will be received by the Department of City Transit, Philadelphia, Pa., William S. Twining, Director, for the construction of the following sections of the Delivery Loop Subway with work appurtenant thereto: Contract No. 201—2567 lin. ft. of two-track subway in Arch Street, between Broad Street and Eighth Street including two stations; contract No. 202—2600 lin. ft. of two-track subway in Eighth Street, between Arch Street and Locust Street, including one station; contract No. 203—2600 lin. ft. of two-track subway in Locust Street, between Eighth Street and Broad Street, including two stations. Copies of plans and specifications may be obtained upon deposit of $50, to be refunded upon return of plans.

Quebec Railway, Light & Power Company, Quebec, Que.—This company reports that it will construct an extension from Third Avenue and Fifth Street along the Beauport Road East to the city limits, about 1½ miles.

Charleston-Isle-of-Palms Traction Company, Charleston, S. C.—This company reports that during 1917 it expects to double-track about 1 mile of its Navy Yard line.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—During the next few months the Salt Lake & Ogden Railway plans to construct a second main track between Centerville and Farmington and to connect the double track between Layton and Clearfield. When this is completed the road will be double track all the way to Clearfield, leaving about 8 miles of single track on the whole line. The track between Bountiful and Centerville is to be reballasted and the 60-lb. rail will be replaced by 85-lb. rail.

Virginian Railway, Norfolk, Va.—It is reported that the Virginian Railway is making investigations with a view to the possibility of operating electric locomotives on its line between Elmore and Clarks Gap for the handling of heavy coal trains.

SHOPS AND BUILDINGS

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—An interurban passenger station, a package freight depot and carhouse will be built at Sixth and Clybourn Streets, Milwaukee, by the Chicago, North Shore & Milwaukee Railroad. The company purchased the property, which has a frontage of 270 ft. on Sixth Street and a depth of 150 ft. on Clybourn Street, at a cost of $200,000.

Fort Dodge, Des Moines & Southern Railway, Boone, Iowa.—It is reported that the Fort Dodge, Des Moines & Southern Railway and the Chicago & Northwestern Railway plan to construct a passenger station at Webster City at a cost of about $50,000.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to the Seventh Avenue Construction Company, New York, for station finish for nine stations on the lower portion of the Seventh Avenue subway between the Battery and Fourteenth Street, inclusive. The contract price for the work is $389,880. Two of the nine stations are express stations. The six remaining stations on this line are already under contract. The Seventh Avenue Construction Company was the lowest bidder for the construction of station finish for six of the stations on the underground portion of the Southern Boulevard and Westchester Avenue extension of the Lexington Avenue subway. This portion of the extension begins under East 138th Street and terminates near Whitlock Avenue and Bancroft Street. Thence to its terminus at Pelham Bay Park the line is an elevated structure. No bids have been taken for stations on the elevated portion of the line.

Oshawa (Ont.) Railway.—It is reported that the Oshawa Railway will soon let contracts for the construction of a carhouse at Oshawa, new rolling stock and other equipment to cost about $100,000.

Eastern Pennsylvania Railways, Pottsville, Pa.—This company's carhouse at Palo Alto was destroyed by fire on Jan. 6, as described in the news department of this issue.

POWER HOUSES AND SUBSTATIONS

Kentucky Traction & Terminal Company, Lexington, Ky.—A program of betterments for the Kentucky Traction & Terminal Company to cost about $200,000 has been announced by S. H. Dailey, general manager of the company. The installation of a new 4000-kw. generator and provision for nine voltage regulators are included.

Toledo Railways & Light Company, Toledo, Ohio.—Work has been begun on the new power house for the Toledo Railways & Light Company on the Maumee River near the center of the city. Contracts have been let to M. V. Kellogg & Company, New York, for two stacks, each 275 ft. high and 16 ft. inside diameter, to be constructed of radial brick.

Philadelphia (Pa.) Rapid Transit Company.—This company plans to reconstruct and extend its power plant on Kensington Avenue, Philadelphia.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Business Announcements Trade Literature

Line-Material Orders Indicate Unusual Activity

Reports Considerable Trolley Maintenance Material Business Reported—Prices on Malleable Parts Continue to Rise—Composition Insulation Scarce, but General Manufacturing Situation Improved

E. F. Wickwire, sales manager of the Ohio Brass Company, when recently interviewed by a representative of the ELECTRIC RAILWAY JOURNAL, stated that in normal years trolley material orders are usually scarce in the winter months, but that the inquiries in November and December, 1916, were and still are numerous and that the sales are comparatively large—larger, in fact, than those for ordinary summer months. The material now being ordered is mostly for maintenance and renewal work. Little material is being purchased for extensions or for new lines. The underlying reasons for this condition have been set forth frequently. A remarkable increase in the number of trolley-wire splicers purchased is a definite indication of the plan now being followed by most roads to retain old trolley wire in service just as long as it can possibly be made to do the work.

LABOR AND RAW-MATERIAL SITUATION STILL TENSE

The raw-material price situation continues tense. Prices on malleables, such as are used for line-material manufacture, have been advanced 20 per cent. within the last thirty days, notwithstanding an increase on Jan. 1, 1916, of 30 per cent, and the necessary payment throughout the year of bonuses in order to get deliveries from the foundries. Malleable castings for overhead fittings require special care in making. The ordinary run-of-the-foundry malleable casting is not sufficiently accurate nor are its surfaces smooth enough. Accuracy also is particularly desirable, and to assure uniformity in strength the castings must be properly annealed. In busy times all of these requirements for the malleable foundries mean increased difficulty for the line-material manufacturer, not only to get deliveries but to maintain his standard quality of product. Close supervision of foundry practice and thorough inspection of output are the safeguards used.

Composition insulation, which forms a most important part of insulated hangers, has at times during the past year been the cause of much embarrassment to the line-material manufacturers. For example, one important ingredient in the composition insulation manufactured by the Ohio Brass Company is imported, and in normal times its price ranges from 14 cents up to 18 cents per pound. That material now costs about 40 cents per pound and is difficult to get. Early last year one cargo was entirely lost, and this necessarily interfered with manufacturing progress. The prices of other ingredients in composition insulation have not risen in proportion to those of materials which are imported, but still the prices have advanced substantially and the supply of raw material has been irregular.

The market and delivery conditions on copper and zinc are well known. These, next to the labor situation, have probably during the last year caused the overhead line material manufacturer the most trouble. As an illustration of the problems met in the labor end of the manufacturing business, Mr. Wickwire cited an example of one workman and said that this was typical of many. This man was employed in March, 1916, as a common laborer at 17 cents per hour. He was a green foreigner. In April he was raised to 20 cents per hour, and in May he had become broken in to do certain jobs and was raised to 25 cents per hour. A few months later a munition job appealed to him, and he suddenly left to get 30 cents per hour. He was typical of a class that had been taught to do certain work and therefore was more valuable on account of his experience than a new man could possibly be for some time. Hence, the company had to hire him back at still greater wages in order to avoid breaking in a new man.

The raw-material situation, Mr. Wickwire said, is gradually being relieved as manufacturers are catching up with their large orders. The production problem is now fitted to a schedule. It proceeds regularly except when special designs are ordered. Then, when new patterns are required and only small lots are to be made, it is difficult first to get the patterns made, then to get them started through the foundry. Later the special job has to be forced into the shop schedule where large standard lots are commanding the tool equipment. Now more than ever does standardization mean much to the manufacturer as well as to the railway.

J. G. Buehler Discusses Car Equipment and Tool Specialties

Increased Production, Careful Handling of Labor Problems, and Large Reserve Supply of Raw Materials Are the Only Factors Which Will Prevent Further Advance in Prices

J. G. Buehler, president of the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., when interviewed recently by a representative of the ELECTRIC RAILWAY JOURNAL, reported that orders for accessories, such as forgings, brake-rigging repairs, armature and field coils, brushholders, armature and axle bearings and electrical repair tools, which have long been delayed, are being received regularly. Although no exceedingly large individual orders have been placed, with one or two exceptions, the aggregate of all the orders is considerable. Furthermore, the prospects are that orders for the next three months will total even more than those placed for the same period previous to this time.

PROMPT DELIVERIES BEING MADE

This company has been particularly fortunate in being able to make prompt deliveries. This has been due directly to the fact that a large reserve supply of raw materials was obtained before prices were forced up by the present crisis, which has been particularly acute in the material and labor markets during the last nine months. With the possible exception of orders which required large amounts of brass and copper tubing, brass sheets and magnet wire, no difficulty has been experienced from a shortage of raw materials, and in these cases the materials were obtained practically regardless of cost in order that the product might be supplied without too great a delay to the purchaser. With the exception of malleable castings, on which about three months' delivery is required, nearly all orders have been delivered promptly, and to quote Mr. Buehler, "Not more than a dozen letters have been received complaining of not having received deliveries on the dates promised."

As a considerable percentage of the business consists of repair parts, including motor axle bearings, brushholders, brake pins, third-rail contact shoes and iron and brass forgings of different kinds, about $50,000 worth of repair parts are kept in stock. In addition, complete stocks of patterns, dies, jigs and drilling templets (75 per cent of all of the patterns, etc., being for repair parts) enable the company to make exceedingly quick deliveries. Patterns and dies (some of which cost $500 a set) are seldom destroyed, and if an order is obtained but once in two years, it is

cheaper to keep the dies on hand than to try and reproduce them. The advantage of keeping on hand these large stocks of patterns and dies, which are said to represent an investment of more than $100,000, is evident. In case of a breakdown, due to the failure of a casting or forging in a company's equipment, it is imperative that the repair be made quickly. An order for a new casting is usually phoned in or the broken part is received by express. The pattern is then taken from the shelf and put in the sand, the mold is poured and the casting is machined and shipped by express to the customer the next day. This applies to almost any type of casting, as the company has its own gray iron shop, brass foundry, sheet-iron shop, machine shop, forge shop, pattern shop and foundry, and maintains a considerable night force. By this procedure a large volume of emergency repair business has been obtained. On the other hand, these repair jobs are expensive, and if time permits a near-by purchaser will often place his order with a manufacturer in a distant town where the cost of labor is considerably less and where raw material can be more readily obtained.

Labor Problems Difficult

The most serious problem which this company has had to confront is that of skilled labor. Although wage increases of from 15 to 25 per cent have been made throughout the plant, machinists, tool makers, molders, sheet-iron workers, etc., have been exceedingly hard to keep. As an incentive to the men to make more money, a bonus system was placed in operation, and this has not only increased production but has helped materially in making better deliveries. In addition to the bonus system, the foremen in the plant, and all of the office help, clerks in the shipping department, etc., received an extra month's salary at Christmas, and a present was made to every man on the payroll of a $5 gold piece.

Tight Money Means High Prices

A large reserve supply of raw materials, careful handling of labor and increased efficiency in shop methods are the factors which are working against a further advance in prices. Some of the manufacturers are fortunate in having immense stocks of raw materials, and these are invariably the last to increase prices. Payments for purchases of raw material by manufacturers from the mills and factories are now quoted at thirty days net, where formerly sixty to ninety days could be obtained. This has caused inconvenience to some manufacturers, as in many cases production has more than tripled in the last two years, and it is necessary for the manufacturers to borrow money from the bank or have an immense outlay. In some lines, when the mills tighten up on the manufacturer, he in turn requires prompt payment from the customer or jobber, but this rule hardly applies where the customers are all railways, because they discount their bills promptly.

Steam Roads Show Big Gains

Small Mileage Increase but Equipment Ordered Exceeds That for Any Year Since 1912, Earnings Per Mile Exceed Previous High Record

The year 1916 has been one of record-breaking traffic and earnings for the railways of the United States. This fact is well known to the manufacturing as well as the operating side of the electric railway industry and therefore the following statistics, gathered by the *Railway Age Gazette*, will be of interest.

The mileage of new steam railroad track built during 1916 was 1098 miles. In 1915, only 933 miles were built, this having been the smallest amount of new construction in any year since the Civil War. The largest amount of new construction was in Montana, where 99 miles of railway were built; South Carolina being second with 92 miles, and California third with 78 miles. New construction in Canada shows a heavy decline. The new mileage found to be projected in the United States is 727; that being surveyed, 2126 miles; and that being actually built, 1060 miles.

The increase in the purchase of new steam road equipment was much greater relatively than the increase in new construction. The following table gives the number of cars and locomotives ordered by the steam railways of the United States within the last three years:

	1916	1915	1914
Freight cars ordered	170,000	107,796	80,264
Passenger cars ordered	2,349	3,092	2,002
Locomotives ordered	2,923	1,573	1,265

The number of freight cars ordered for domestic service is larger than in any year since 1912, and the number of locomotives ordered for domestic service is larger than in either 1914 or 1915. The number of freight cars ordered for export was 25,632, as compared with 13,222 in 1915; and the number of locomotives ordered for export was 2983, as compared with 850 in 1915.

The year closes with sixty-three railways having an aggregate of 34,559 miles of line in the hands of receivers. This compares with a mileage of 38,661 which was in the hands of receivers at the beginning of 1916.

The total mileage of railways operated under the block system at the end of the year is 99,885. Of this, 32,978 miles is automatic, an increase of 1818 miles.

In the five years ending with 1906 the total number of freight cars ordered was almost 1,100,000, or an average of over 218,000 a year. In the five years ending with 1916 the number ordered has been only about 740,000, an average of about 148,000 a year.

The foregoing statistics set forth in a startling manner one of the most important facts to be considered in connection with the present situation of the railways. The car shortage and traffic congestion of 1906 came at the end of a decade during which there had been a great expansion of transportation facilities, while the car shortage and congestion of traffic in 1916 have followed immediately on the heels of a long period of depression during which the increase of facilities has been relatively small. Since steam railway facilities have proved inadequate at the beginning of the present period of prosperity, what kind of a situation will it cause to develop if industry steadily grows more active and traffic heavier, as it did for several years prior to 1906?

The net operating income of the steam railways during the year just closing has been unprecedented, probably averaging more than 6 per cent on the investment in road and equipment. Until within the last eighteen months average gross earnings per mile per month had exceeded $1,300 in only one month, October, 1912. In August and September, 1916, all previous records were broken with earnings of $1,418 and $1,409 per mile.

General Business Conditions

General Feeling of Optimism for Future, Except in Sections Having Poor Crops

The general business conditions throughout this country near the end of 1916, as reported by the committee on statistics and accounts of the Chamber of Commerce of the United States, are good, as may be judged from the accompanying chart. Although optimism is the general feeling, there are some sharp exceptions to this in those sections where the crops are poor, but on the whole the showing is much better than that made last year, as indicated by a sim-

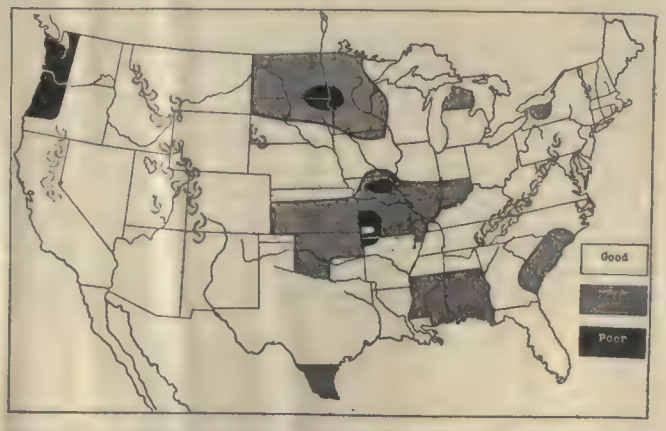


CHART SHOWING BUSINESS CONDITIONS IN THE UNITED STATES AS OF DEC. 2, 1916

ilar chart in the ELECTRIC RAILWAY JOURNAL of Jan. 15, 1916, page 127.

At the present time, it is said, there is little apparent fear of there being in the near future that readjustment which it is generally believed will come with peace in Europe. There is concern in some sections, however, as to the probable effect upon demand of the present high prices, and especially if they should increase.

ROLLING STOCK

Geneva, Seneca Falls & Auburn Railroad, Waterloo, N. Y., is reported to be in the market for two cars to be used on its Geneva city lines.

Eastern Pennsylvania Railways, Pottsville, Pa., lost twenty open and service type cars on Jan. 6 in a fire which destroyed its Palo Alto carhouses.

Illinois Traction System, Peoria, Ill., is having the following cars built by the American Car & Foundry Company: 100 box cars, 60 hopper-bottom coal cars and 40 flat-bottom gondolas. In addition, the company has received a snow-plow from the McGuire-Cummings Manufacturing Company.

International Railway Company, Buffalo, N. Y., has awarded a contract to the Kuhlman Car Company of Cleveland, Ohio, for rebuilding twenty old-type cars. In addition, ten old cars are being rebuilt in the company's Cold Spring car shops. They are being equipped with new vestibules, folding steps, cross-seats, etc.

East St. Louis & Suburban Railway, East St. Louis, Ill., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1916, as expecting to rebuild five closed motor cars, have ordered these from the American Car Company, and have specified the following details for this equipment:

Seating capacity 44	Curtain material.....Pantasote
Weight (car body only) 16,000 lb.	Door operating mechanism.. American Car
Bolster centers, length. 22 ft. 4 in.	
Length of body.....31 ft. 8 in.	Gears and pinions..GE Grade M
Over vestibule .....46 ft. 4 in.	Westinghouse
Width over sills.....8 ft. 6 in.	Hand brakes...Adams & Westlake, No. 46 staff
Body, wood or metal.....Metal	
Interior trim.....Agasote	Heaters....Peter Smith Electric
Headlining .....Agasote	Journal boxes....American Car
Roof, type .....Arched	Motors, type and number.... 2 West. 532-B
Underframe .....Metal	
Air brakes.....General Electric	Motors.....Outside hung
Axles .....American Car	Registers .....Ohmer
Bumpers ..Hedley Anti-climbers	Sanders.....Leach Locotype air
Cables .....Westinghouse	Sash fixtures.....American Car
Car trimmings....American Car	Seats, style.....Hale & Kilburn
Control type..GE. PC.. Westinghouse K36J Double end	Walkover
	Seating material.....Rattan
Window fixtures..American Car	Step treads.....Feralin safety
Destination signs..Hunter Illuminated	Trolley base.....Peerless
	Wheels.....Davis cast steel

TRADE NOTES

McQuay-Norris Manufacturing Company, St. Louis, Mo., announces that three mechanical engineers—H. C. Coleman, Carl E. Finch and H. R. Souther—have been added to its sales force in the field.

Automatic Ventilator Company, New York, N. Y., has been appointed exclusive sales agent in the State of Ohio for the sale of the "Flower" brush holder, air handles, controller handles, etc., by the manufacturer, D. B. Flower of Philadelphia, Pa.

Johnson Fare Box Company, Chicago, Ill., through its Eastern agent, the U. S. Metal Manufacturing Company, has received an order for thirty-five Johnson fare boxes from the Maryland Electric Railways and one for 210 Johnson fare boxes from the United Railways & Electric Company, Baltimore, Md.

Ohio Brass Company, Mansfield, Ohio, is assignee of patent No. 1,209,742 dated Dec. 26, 1916, covering a method of bonding rails. The bond is formed of a plurality of members having the ends encircled by a sleeve of steel or iron to form a terminal which is united to the rail by heating the bond ends and the rail with a gas flame and applying the attaching metal integrally to the heated parts.

Horne Manufacturing Company, Brooklyn, N. Y., announces that as an adjunct to the Lord Manufacturing Company's products which have been acquired recently, it has arranged to take over the railway output of the Channel Packing & Rubber Company, New York, N. Y., and is now in a position to supply air brake hose and rubber hose of all kinds, "Wedgeset" cylinder and piston packing and "Marvel" sheet packing, gaskets, etc.

Presto-O-Lite Company, Inc., Indianapolis, Ind., announces the organization of its many activities in the railway field into a separate and distinctive department of railway sales and service, in charge of Stanley D. Winger, manager of railway sales and service. This places at the disposal of the electric railways a corps of specialists on oxy-acetylene welding and cutting, brazing, lighting and the many other forms of acetylene service.

Edward N. Hurley of Chicago, who was appointed a member of the Federal Trade Commission at the time of the formation of the commission, two years ago, and who for the last year has been the chairman of the commission, has resigned that office in order to resume his business connections in Chicago as presiding officer of the Hurley Machine Company and other corporations in which he is interested.

H. W. Johns-Manville Company, Cleveland, Ohio, has opened a new office at 911 Walnut Street, Des Moines, Iowa, thus bringing the total number of its branches up to fifty-five. William B. Roberts, who has been with this organization for a number of years in the Iowa district, has been appointed manager of the new office, and will have under him a corps of salesmen and construction men which will enable the company to give the highest class of service.

Van Dorn Coupler Company, Chicago, Ill., reports that it has received within the last few weeks a number of coupler orders, which include the following: J. G. Brill Company, for the cars of the United Railway & Electric Company, Baltimore, Md., 200; Brooklyn Rapid Transit Company, 450; Western Wheeled Scraper Company, 10, and Chicago Elevated Railways, 100. The types of couplers ordered vary from the small link-and-pin to the heavy interurban M. C. B. type. The Brooklyn and Chicago Elevated orders call for both motor car and trailer car types.

Samuel G. Hibben, formerly head of the engineering department of the Macbeth-Evans Glass Company, Pittsburgh, Pa., and associated with the Westinghouse Electric & Manufacturing Company, has recently become identified with the Westinghouse Lamp Company. Mr. Hibben is well known in the several electrical and engineering organizations, and particularly for his activities in the Illuminating Engineering Society, being chairman of the Pittsburgh section. He has also been engaged in consulting work in the lighting of a number of large buildings. Mr. Hibben will continue in engineering work and will make his headquarters at the Pittsburgh office.

Ohmer Fare Register Company, Dayton, Ohio, reports that a decision was handed down on Dec. 15, 1916, by the United States Circuit Court of Appeals in a suit for infringement brought by the company against the Recording & Computing Machine Company of Ohio, the Dayton Fare Recorder Company of Ohio, and the Dayton Fare Recorder Company of Washington, D. C. The court found that the defendants had infringed claims, 4, 6 and 13 of patent No. 646,757, issued April 3, 1900, to John F. Ohmer, relating to improvements in multiple fare recorders. As stated in the specification of this patent, "in a broad sense the improvements comprise mechanism by means of which printed statements, impressions, or records of the different classifications of fares, of the month and day of the different trips, and of the number of the register may be taken on a single sheet and by a single operation."

ADVERTISING LITERATURE

Rowan Electric Manufacturing Company, Inc., of Baltimore, Md., has prepared a loose-leaf booklet on its Automatic Protective and Control Devices for Electric Motors.

Metropolitan Engineering Company, Brooklyn, N. Y., has issued a bulletin on "Cable Failures and the Remedy." This bulletin contains a detailed description of an oil-filled cable joint, which is used on cables carrying up to 16,000 volts.

Stromberg-Carlson Telephone Manufacturing Company, Chicago, Ill., has issued a pamphlet on its new test set No. 844. This set is a complete telephone in every respect, including in its equipment, transmitter, receiver, generator, hook switch and battery.



Prosperity Pairs With King Peacock

The old Irish scribes say that when a good King reigned—

"The earth produced exuberant crops, the waters teemed with choice fish, cattle were unusually prolific—

"While cows yielded such abundance of rich milk that they shed it in torrents upon the pastures, the very furrows being always filled with the pure lacteal produce of the dairy."

We're not making such strong claims about electric railway prosperity under good King Peacock.

But it is a fact that where King Peacock reigns, there are produced exuberant crops of good relations with your men and your public because

Your men are saved hard work while passengers, pedestrians and vehicle operators are assured maximum safety.

The Eccentric Drum



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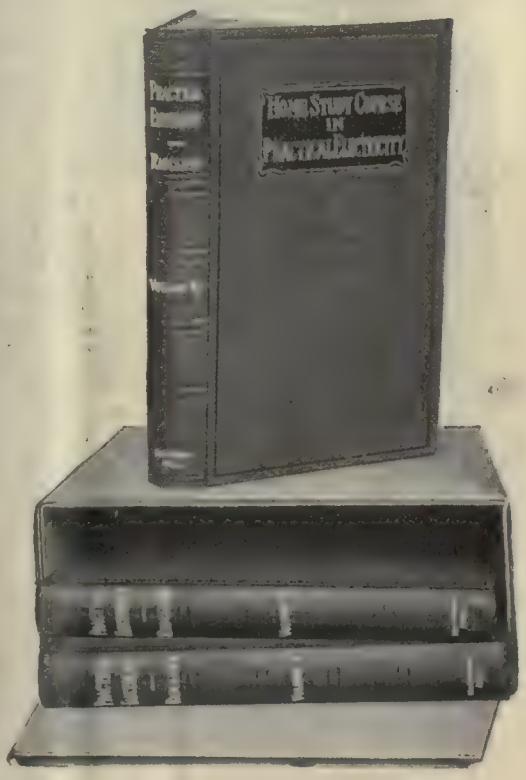
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No matter what branch of electricity you are interested in, you like to know just how the electrical worker performs his work. You may want to do the work yourself, or tell the other fellow how it is done.

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Veneer on a piece of furniture will crack and peel and split, even indoors, unless given constant care.



But Agasote Roofing won't crack or peel or split even on a car roof where it is exposed to the elements.

Again We Say It—

Agasote Roofing Won't Split: It is Homogeneous

The expansion and contraction of heat and cold—the soaking, driving rain of spring and autumn, the scorching sun of summer and sticky, clinging snow of winter can't harm Agasote Roofing, because it is homogeneous—it is the same all the way through—it is not built up in layers. Moreover,

The Longer It's Used The Stronger It Grows

because it undergoes a molecular action very similar in its results to the action which takes place in the progressive "setting" of cement. Exposure to the elements only makes it harder, tougher and stronger.

Its strength is ample to carry your current-collecting equipment—to allow car crews to walk on the roof with impunity—to resist a smashing blow from a wild trolley pole.

It is lighter—costs less to haul around—than ordinary car roofing. It requires less than half as many carlines—is easier, quicker and cheaper to put on.

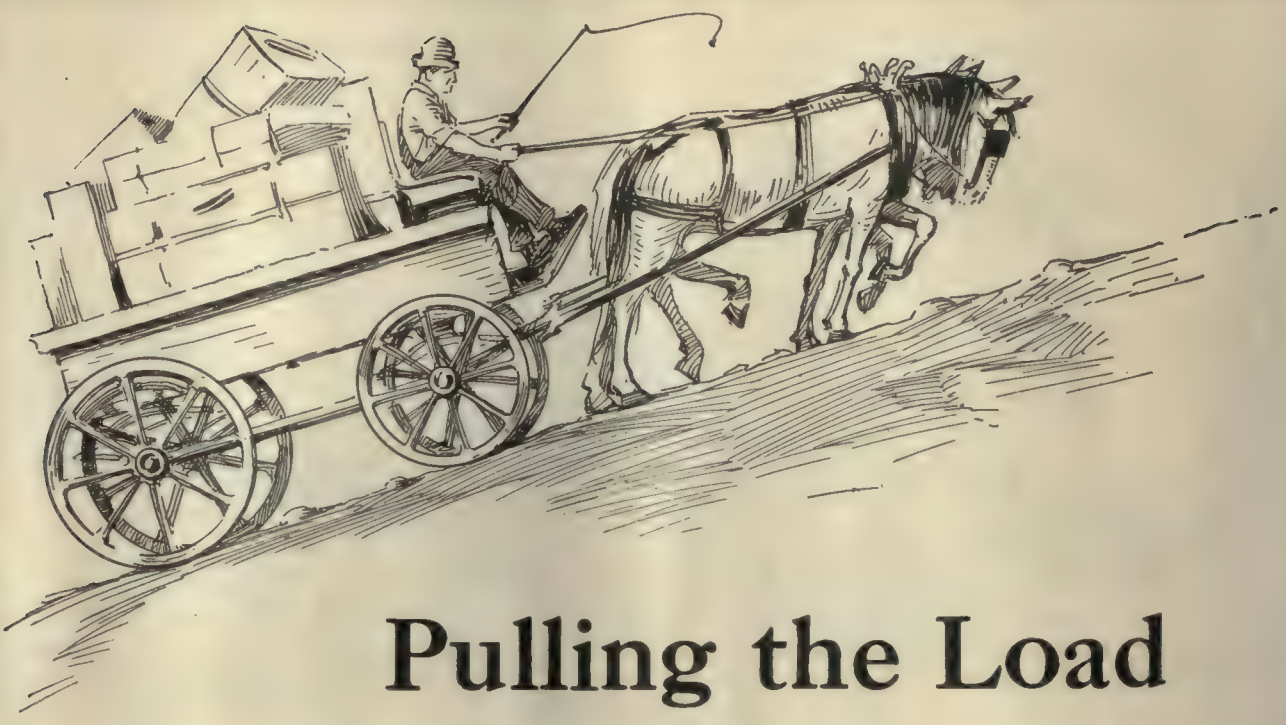
These advantages are big, important ones—they merit your careful investigation.

The Pantasote Co.

Manufacturers also of Pantasote—the most widely used and highly Standardized railway car curtain material on the market.

11 Broadway, New York **People's Gas Bldg., Chicago, Ill.**

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Pulling the Load

Down hill and on the level, a load moves easily; but up a grade it is a hard pull. You wouldn't try to move a load up hill with the brakes set. But that is the practice in many powerhouses. Any ordinary oil answers the purpose fairly well when the engines are running light, but when the load comes on and the pull is up hill, then every bearing should turn with the minimum of friction —you need the best oil you can buy.

Specially compounded of the finest materials to meet the severest service, Galena Oils are unequalled for powerhouse lubrication. They are so exceptionally good that we stand back of them with a guarantee of service and cost.

Galena-Signal Oil Co.

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The Best Bearings Need Good Lubrication

You can't expect the babbitt to do all the work in a bearing.

So properly placed, clean-cut oil grooves are a necessity in getting full life and full satisfaction out of a bearing.

You'll get that full life and full satisfaction out of Columbia bearings just as you will from all other Columbia products.



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Armature and axle straighteners
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Car replacers
Coil taping machines for armature leads
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Armature and field coils
Brush-holders and brush-holder springs
Brake, door and other handles
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Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail contact shoes and accessories
Trolley poles (steel) and wheels





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Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco

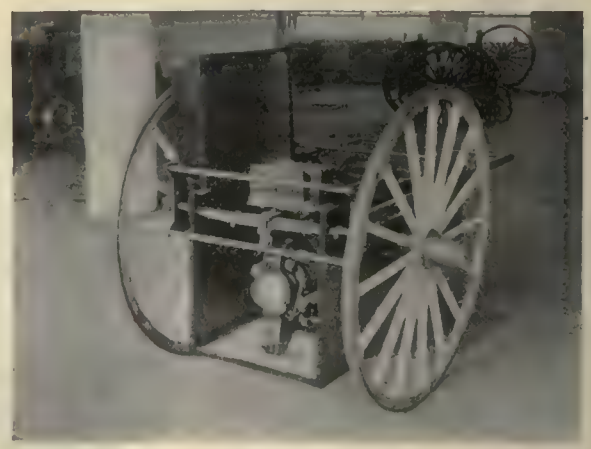
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enables two men to install bonds at the rate of 30 per hour. Any road equipped with a Lincoln bonding machine can rapidly install bonds that will insure a return circuit of maximum conductivity.

No drilling, no grinding. The electric arc throws off the scale, rust or dirt, and leaves a clean welding surface.



Something New!
A Lincoln Bonding Machine fully equipped, mounted on a two wheel cart. It's ready when you want it.

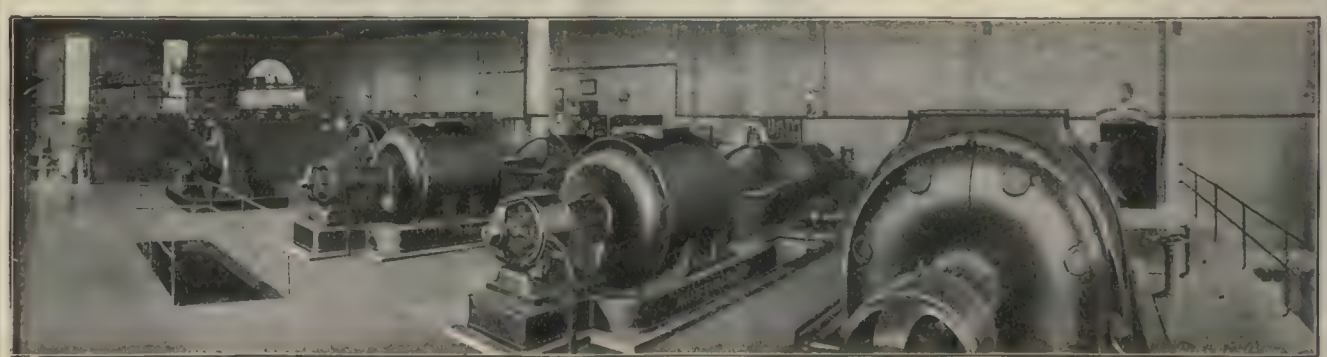


The fact that we have saved from 20 to 50 cents per bond for others proves that we can do the same for you.

—the greater your mileage, the greater will be your saving. We will gladly send further details.

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AGENTS:
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Under an Allis-Chalmers contract you may purchase a single generator or prime mover, a complete electric unit or your entire power and electrical equipment.

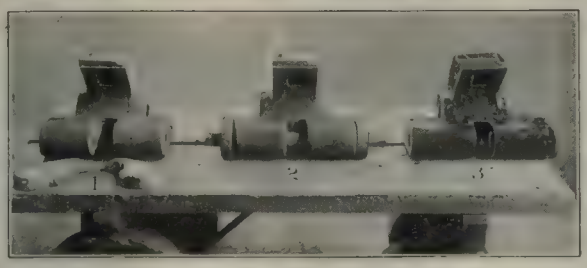
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Such a contract with its undivided responsibility necessarily means responsible supervision, a guarantee of completeness as well as a saving in expense.

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Oxy-Acetylene Welding and Cutting



Three stages of lengthening car knuckles
(1) *11-in. knuckle with two 1-inch pieces to be added.*
(2) *Pieces in place—ready to weld.*
(3) *A finished knuckle—13 in. long.*

Coupler Knuckles Made 2" Longer by Welding

A very unusual application of oxy-acetylene welding was the lengthening of M. C. B. coupler knuckles from 11 inches to 13 inches, in the T. H. I. & E. Co. shops. The additional 2 inch length was necessary to eliminate uncoupling of cars at sharp changes in grade at approaches to bridges, etc.

To obtain new 13 inch castings would have required new patterns, and meant "junking" the 11 inch knuckles, valued at $4.50 each; to say nothing of high price and uncertain delivery of the new castings. With the oxy-acetylene cutting torch pieces were cut to shape from 1 inch steel plate, forged to fit and then welded one to each end of the knuckle with the welding torch. The average cost per knuckle for entire work was $2.26.

Greater economies are made possible for shops of every size by oxy-acetylene welding. In hundreds of instances it has effected large savings in time and material—saved valuable parts from the junk pile, and made unnecessary the purchase and stocking of expensive repair parts.

Investigate the possibilities this process has for your road.

Prest-O-Lite PROCESS

Employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene (ready-made carbide gas) is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work, and lower cost, and also avoids the large initial outlay and heavy depreciation incurred in making crude acetylene in a carbide generator.

Necessary equipment is not expensive. We furnish high-grade welding apparatus for $60 (Canada, $75); acetylene service at additional cost. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe. Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene—any average workman who understands metals can learn the process quickly and easily.

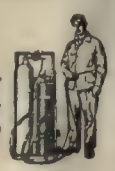
Write us for information on any phase of welding work you are planning, whether repair, maintenance or construction work. We'll be glad to give you expert advice and valuable data.

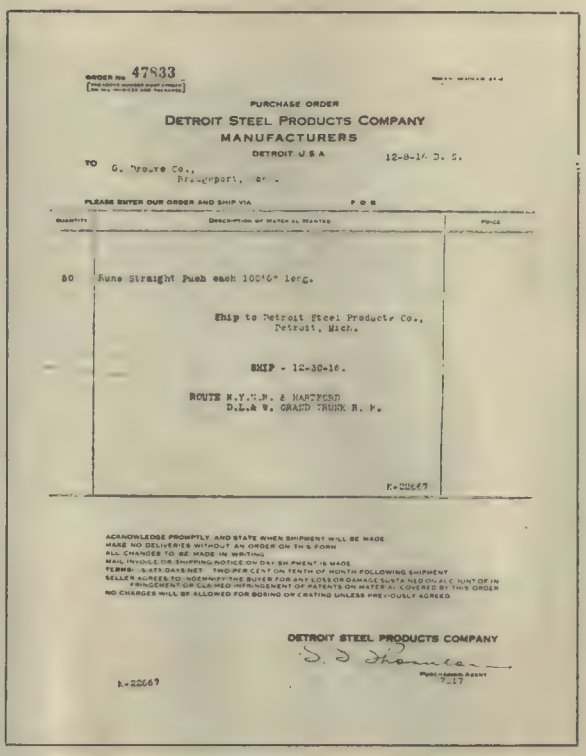
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DETROIT STEEL PRODUCTS COMPANY
MANUFACTURERS
DETROIT U.S.A. 12-8-16 D. S.

TO G. Drouve Co.,
Bridgeport, Conn.

PLEASE ENTER OUR ORDER AND SHIP VIA F.O.B.

QUANTITY	DESCRIPTION OF MATERIAL WANTED	PRICE
50	Runs Straight Push each 100'6" long.	

Ship to Detroit Steel Products Co.,
Detroit, Mich.

SHIP - 12-30-16.

ROUTE N.Y.N.H. & HARTFORD
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Recommend and Order

"Straight-Push"

The Detroit Steel Products Co., the well-known manufacturers of Fenestra Steel Sash, have recommended, ordered and used "Straight-Push" sash operators since the beginning of the manufacture of steel sash.

An Order for 5000 Feet

A tribute of confidence comes from the Detroit Steel Products Co. in the above order for 50 runs of 100 feet each.

Such an order we consider a vote of confidence. The "Straight-Push" Sash Operator never falls down on its guarantee. Ask us for detailed data.

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Decreases Gear Costs by Increasing Gear Service

We are experts at gear cutting, hardening and heat treating, and know how to produce gears which will give long and satisfactory service.

We want to demonstrate this claim—what are your requirements? Write Dept. E. R. J.

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Tape Security is Possible

Why not guard your equipment against attack? An easy and quick way to fortify is to specify any of our

Dependable Brands

Protection where high voltage wires interlace requires extra defensive measures

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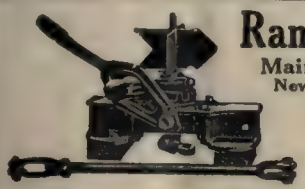
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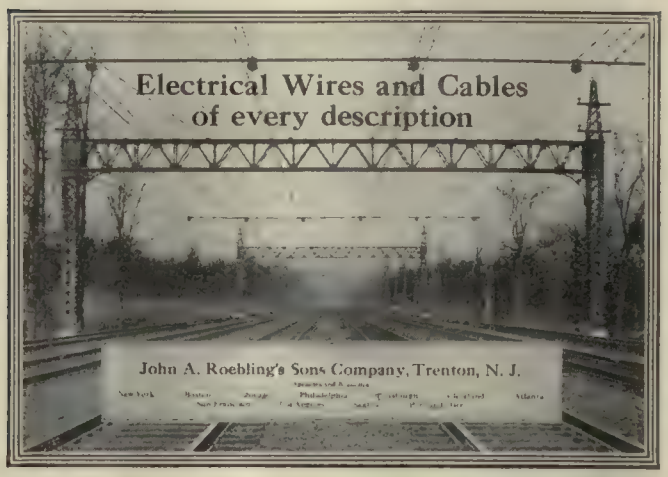
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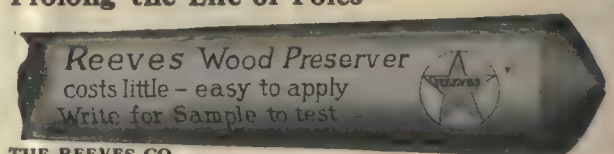
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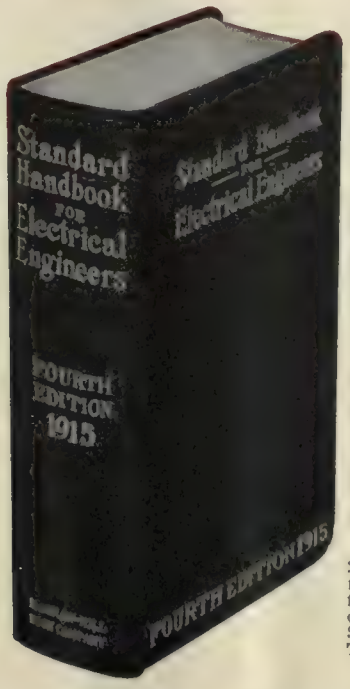
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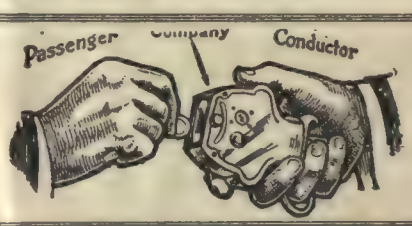
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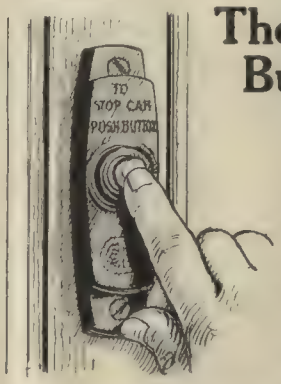


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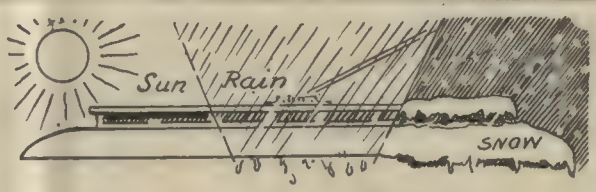
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RAILWAY UTILITY CO.

Sole Manufacturers
"Honeycomb" and "Round Jet" Ventilators
for Monitor and Arch Roof Cars, and all classes of buildings; also
Electric Thermometer Control
of Car Temperatures.
721 W. FULTON ST. Chicago, Ill. | *Write for Catalogue* | 1328 BROADWAY New York, N.Y.

PROVIDENCE FENDERS — H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Manufacturers of The Providence Fender and H-B Life Guard
Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents

The Eclipse Railway Supply Co.
CLEVELAND, OHIO

Manufacturers of the
ECLIPSE LIFE GUARD — ECLIPSE WHEELGUARD
ECLIPSE TROLLEY RETRIEVER — ACME FENDER

"GLOBE" VENTILATORS



An Efficient, Leakproof Ventilator at a reasonable price
Globe Ventilator Co., Troy, N.Y.

SEARCHLIGHT SECTION

10556 lbs.

400,000 C. M., B. & S., bare copper cable, on six (6) reels of approximately 1760 lbs. each.

46616 lbs.

500,000 C. M., B. &. S., bare copper cable, on twenty-three (23) reels of approximately 2025 lbs each.

W. R. Kerschner Co., Inc.
50 Church St., New York, N. Y.

86 Ton Electric Locomotive

Built by The General Electric Co.

Rating 808-E-172-4GE94-600 V.

Dimensions and Weights:

Length inside knuckles	35' 2"
Length over cab	32' 6"
Height over cab	12' 1"
Width over all	10' 1"
Total wheel base	29' 0"
Rigid wheel base	12' 0"
Track gauge	4' 8½"
Total weight	172,500 lbs.
Weight on drivers	117,200 lbs.
Maximum safe speed	60 MPH.
Minimum radius curvature	150 ft.

EQUIPMENT:

Four G.E.-94 bipolar gearless motors with type M multiple unit control; combined straight and automatic air brake; two 16" electric headlights; air operated bell; whistle; pneumatic sanders, etc.

SPEEDS:

Control equipment is arranged for three economical running speeds; slow for switching service, medium for freight service and high speed for fast freight and passenger service.

MacGovern and Company, Inc.
114 Liberty Street
New York City

IMMEDIATE SHIPMENT

400 Kilowatt 60 Cycle Rotary Converter

1—400 KW. Westinghouse, 3 ph., 60 cy., 370 v. A. C., 575 v. D. C., speed 600 revolutions.

200 Kilowatt 60 Cycle Rotary Converters

2—200 KW. Westinghouse, 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 rpm., with starting motors, also transformers if desired.

150 Kilowatt 60 Cycle Rotary Converters

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

150 Kilowatt 25 Cycle Rotary Converters

2—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

Transformers

3—185 KVA. Gen. Elec., type A. C., 25 or 60 cycles, 2300 volts primary, 430 volts secondary.

4—125 KW. Westinghouse transformers, single phase, 60 cycles, 15,000 volts primary, 340/360 v. secondary.

4—100 KW. Westinghouse transformers, oil insulated, single ph., 60 cy., 2300 v. primary, 360 v. secondary.

4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. primary, 430/362 v. secondary.

3—75 KW. Westinghouse, oil insulated, 60 cycle, 6600 or 13,200 v. primary, 220 v. secondary.

Railway Motors

2—75 to 90 HP. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

IMMEDIATE DELIVERY

ARCHER & BALDWIN
114-118 Liberty Street New York City
TELEPHONE 4337-4338 RECTOR

CARS FOR SALE

OPEN and CLOSED
MOTOR and TRAIL
Write for Price and Full Particulars to

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg. Philadelphia, Pa.

COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD
STREET RAILWAY MOTORS

GET OUR PRICE WE CAN SAVE YOU MONEY

America's Greatest Repair Works

CLEVELAND ARMATURE WORKS, Cleveland, O.

Try Journal "Positions Wanted" columns for high grade positions.

Try Journal "Positions Vacant" columns for high grade assistants.

Get your Wants into the Searchlight

SEARCHLIGHT SECTION

Get your Wants into the Searchlight

ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word**, minimum charge 50 cents an insertion, **payable in advance.**

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word**, minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

⅛ p. (1⅛x3⅜ ins.)	$5.00	1 in. (1x2¼ ins.)	$3.00
⅛ p. (2⅜x3⅜ ins.)	10.00	4 inches (4x2¼ ins.)	11.60
¼ p. (5x3⅜ or 2⅜x7 ins.)	20.00	8 inches (8x2¼ ins.)	22.40
½ p. (10¼x3⅜ or 5x7 ins.)	40.00	15 inches	40.50

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

1 page	$80 a page	18 pages	$56 a page
3 pages	72 a page	26 pages	52 a page
6 pages	64 a page	32 pages	50 a page
9 pages	62 a page	40 pages	48 a page
12 pages	58 a page	52 pages	45 a page

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE

Galvanized Wire for Sale

Have on hand considerable tonnage of galvanized smooth wire, 4, 6, 7, 8. Also 4 and 8 annealed. Has been wet, but in good condition for use. 100 tons bundling wire; 75 tons flat iron hoops. Odd size nails, etc. Write for list, samples and prices. Nichols Wire Company, Kansas City, Mo.

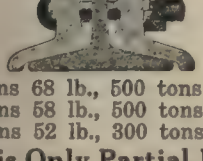
Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

Bridge for Sale

Highway bridge, immediate delivery. Consists of two 56-ft. and 112-ft. deck, pin connected Warren truss spans. Shoes resting on masonry. Trusses 25 ft. C. to C. carrying floor beams 46 ft. long. District roadway to masonry—19-ft. roadway, 36 ft. curb to curb with 6 ft. 3 in. walks. Material, wrought iron, weighing 295,000 lb. Built in 1884. Good condition. At present carries heaviest city and interurban car traffic. For further information apply to Cleveland & Youngstown R. R. Co., 613 Marion Bldg., Cleveland, Ohio.

SPECIAL BARGAINS IN STEEL RAILS



250 tons 68 lb., 500 tons 40 lb.
200 tons 58 lb., 500 tons 30 lb.
700 tons 52 lb., 300 tons 20 lb.

This Only Partial List

Thousands tons, all sections, located throughout country.

CONSULT US

Before buying or selling LOCOMOTIVES, CARS, EQUIPMENT, MACHINERY, TANKS.

ZELNICKER
WALTER A. ZELNICKER SUPPLY COMPANY
in St. Louis

428 First Natl. Bk., Chicago.
910 Hennen Bldg., New Orleans.
Works: East St. Louis.
Main Office, 325 Locust, St. Louis

POSITIONS WANTED

EFFICIENT manager of railway and lighting properties open for engagement. Can put your road on paying basis. Salary, $6,000. Box 1315, Elec. Ry. Jour.

GENERAL shop foreman of large property desires position as master mechanic of smaller shop. Familiar with both interurban and city equipment. Box 1319, Elec. Ry Jour., 1570 Old Colony Bldg., Chicago, Ill.

GENERAL manager electric railway and lighting properties open for position. Twenty years' experience handling properties for large banking concern. Box 1236, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

MR. Railway Builder, Owner, Manager—Am superintendent of power company, but want to change to traction or combination. Thirty, married, technical graduate, nine years' experience. Can handle level and transit; have superintended highway work; can handle construction work. Can fill the bill from turning of sod to scheduled operation of system. Need a Live Wire? No lottery number. Write to H. H. Fenton, Blue Rapids, Kan.

PUBLICITY man who has made the game his profession from choice, not necessity, is ready to take over your publicity problems. A college man, graduate of the newspaper profession and at present the holder of an editorial position closely connected with the electric railway field, I feel justified in urging an interview. Box 1325, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila. Pa.

SUPERINTENDENT of city and interurban lines, now employed, wishes same position with larger property. Best of reference furnished. Box 1266, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

Your Advancement
is largely in your own hands—it is doubtful if any one else is worrying over it

Better positions are constantly being secured through small advertisements in the "Positions Wanted" Columns of *Electric Railway Journal.*

60 cents for 20 words

POSITIONS WANTED

YOUNG man, six years in executive offices large Eastern street railway and lighting company. Now law clerk legal department. College graduate; member of bar. Can handle legal and claim work. Good assistant to busy executive. Box 1223, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS VACANT

DRAFTSMAN for master mechanic's office wanted. Must have good electrical and mechanical knowledge and strictly sober. State experience and salary expected. Box 1320, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.

DRAFTSMAN wanted. Young man with some experience in computing and laying out special track work for electric and steam railroads. Give full particulars with reply and state salary desired. New York Switch & Crossing Co., 15th and Madison Streets, Hoboken, N. J.

ELECTRICIAN wanted who understands Westinghouse H.L. control and automatic air equipment for large interurban company in Middle West. Good position for first class man. Box 1313, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

LARGE interurban company wants first class man experienced in care of automatic air equipment. One who understands Westinghouse H.L. control preferred. Location Middle West. Excellent working and living conditions. If you are qualified write us at once. Box 1312, Elec. Ry. Jour., 1570 Old Colony Bld., Chicago, Ill.

MANAGER wanted. An experienced executive and operating man under forty-five years of age. Medium sized street railroad. Salary from $3,000 to $4,000, according to experience and proven ability. Box 1326, Elec. Ry. Jour.

WANTED—Experienced investigator and adjustor to assist Claim Agent on accident work, only those with experience need apply. Good salary and opportunities. Address E. R., Box 2, Station U, N. Y. P. O.

WANTED at once, car barn electrician capable of rewinding railway armatures and maintaining electrical equipment of eight cars and one electric locomotive. Give full information of experience and salary expected in first letter. Trinidad Elec. Transmission Railway & Gas Company, Trinidad, Col.

WANTED—A superintendent for roadway and overhead electric lines. Must be both practical and technical. Between the ages of 35 and 45. State age, experience and salary expected, with references. Box 1323, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.

The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

Acetylene Apparatus.
(See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device Co.

Alloys and Bearing Metals.
(See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axles.
National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers.
National City Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones B. & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.

Boiler Tubes.
National Tube Co.

Bond Clips.
Electric Railway Improve. Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improve. Co.
Ohio Brass Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Bonds Welded.
Lincoln Bonding Co.

Book Publishers.
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Int'l Creosoting & Constr. Co.
Lindsley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White.
Kerschner Co., Inc., W. R.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
General Electric Co.
Holden & White
Long Co., E. G.
National Brake Co.
National Safety Device Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Brooms, Track, Steel or Rattan.
Zelnicker Supply Co., W. A.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Carbon.
Dixon Crucible Co., Jos.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders.
Anderson Mfg. Co., A. & J. M.

Buckets, Grab.
Beaumont Co., R. H.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunkers, Coal.
Beaumont Co., R. H.

Bunting.
Boyle & Co., Inc., John.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—(See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co., Inc., W. R.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Car Stops, Automatic.
Consolidated Car-Heating Co.

Castings, Brass.
Frankel Connector Co.
More-Jones B. & M. Co.

Castings, Composition or Copper.
Anderson Mfg. Co., A. & J. M.

Castings, Gray Iron and Steel.
Amer. Brake Shoe & Fdry. Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Horne Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car. (See Headlining.)

Chain and Belt Machinery.
Beaumont Co., R. H.

Charging Sets, Storage Battery.
General Electric Co.

Cheese Cloth.
Boyle & Co., Inc., John.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps.
Frankel Connector Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track.
(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Van Dorn & Dutton Co.

Cleats, Car Wiring.
General Electric Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature & Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The
Johnson Fare Box Co.

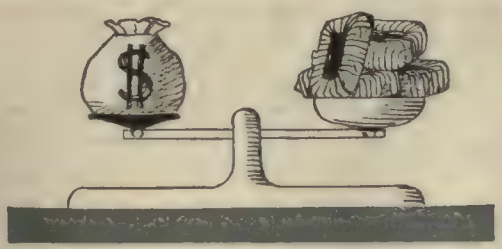
Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
Westinghouse Elec. & M. Co.

Compressors, Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.



They're as Good as Cash

—those old field coils in your shops. Copper is worth too much to send to the melting pot. Send those old coils to us—let us remove the old insulation, clean and anneal the wire and reinsulate it with

Salamander Pure Asbestos

We will then rewind the wire into new coils of precisely the same characteristics as the old ones.

This is much cheaper for you than buying new coils, for the only charge we make is a very small one for the actual insulation used.

Send us some of those old coils so we can show you what we can do.

Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

Working with A Single Purpose

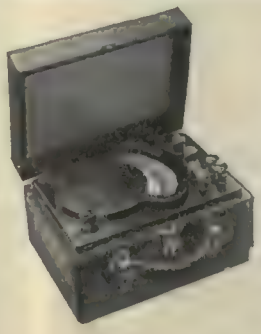
No considerations of expediency, no motives of the moment, ever have influenced the making of

Weston

Indicating Instruments

The single purpose of this Company's founder, and of the Company itself, has been the production of Instruments of Precision which should more and more nearly approach absolute perfection.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A.C. or D.C. Circuits, instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.



Model 310
Single Phase and D. C. Wattmeter

One of the Portable Electrodynamometer Group which also includes Model 329 Polyphase Wattmeter, Model 341 A. C. and D. C. Voltmeter and Model 370 A. C. and D. C. Ammeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1% full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

Weston Electrical Instrument Co.
21 Weston Ave., Newark, N. J.
23 Branch Offices in the Larger Cities

UNIVERSAL ANTI-SLIP TREADS

cars and station steps.

Universal Safety Tread Company
Waltham, Mass.

Have you our new

Trolley Wheel Bulletin

Write for your copy

The Eureka Company **North East, Pa.**

MASON SAFETY TREADS—prevent slipping and thus obviate damage suits.
KARBOLITH CAR FLOORING—for steel cars is sanitary, fireproof and light in weight.
STANWOOD STEPS—are non-slipping and self-cleaning.
Above products are used on all leading Railroads. For details address
AMERICAN MASON SAFETY TREAD CO.
Main Offices: Lowell, Mass. Branch Offices: Boston, New York City, Chicago Philadelphia, Kansas City, Cleveland, St. Louis.

ELECTRIC RAILWAY DEVICES

Rectifier for Frozen Air Pipes.
High Power Compact Hand Brakes, Gear or Differential Types.
Sterling Light Weight Roller Bearing Trolley Bases.
Screenless Air Cleaners for Compressors
Sterling Sand Boxes.
Berg Fenders and Wheel Guards.
Multi-Vapo-Gap Lightning Arresters and Hydrogrounds
Trigger Lock Reversible Controller Fingers.
"Q-P" Trolley Catchers.
Soldered Rail Bonds.
Friction and Insulating Tapes.
Sterling Ticket Punches.
Controller Handles.

HORNE MFG. CO., 50 Court St., Brooklyn, N. Y.

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago Washington, D. C.

RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels

Special Agents for { Tool Steel Gear & Pinion Co. / Johnson Fare Box Co. / C. & C. Electric & Mfg. Co. / Holden & White }

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Connectors, Solderless.
Frankel Connector Co.

Controller Fingers.
Horne Mfg. Co.

Controller Handles.
Horne Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
Beaumont Co., R. H.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
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U. S. Metal & Mfg. Co.
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Wheel Presses. (See Machine Tools.)

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Bemis Car Truck Co.
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Wheels, Car, Steel and Steel Tired.
American Steel Foundries.
Bemis Car Truck Co.
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Wood Preservatives.
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Roller Bearing Co.
Syracuse, N. Y.



Gup

is the Indian for what we call "snooping around for an earful of gossip."

There is no privacy in India. The magnificent staff of native servants is, in effect, a staff of spies. There is no escape from them. From the time you tumble out of bed in the morning to the hour when you turn in again, you are never free from the sensation of "somebody there." One lives in a perpetual "qui vive" amidst these Sepia surroundings.

What a chance this custom would give us if it were ethical to talk about competitors of Morganite carbon brushes and their envy of how our engineers prescribe successfully for commutation troubles.

But we will pass up this chance for a slam, hold our heads high and go on about our great business of making and prescribing Morganite carbon brushes for men who place a value on efficient commutation.

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150 Steuart Street, San Francisco, Cal.

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Printing begins on Tuesday of each week.
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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TITANIUM-TREATED RAIL

On a St. Louis Curve

Curves are mighty good places to test the merits of Titanium-treated rail, but Titanium is just as superior for tangents.

On Gravois Avenue, St. Louis, 7¼ miles of Titanium-treated single track were placed in 1914. This rail is an A.R.A. 100 lb. T section of the following chemical content:

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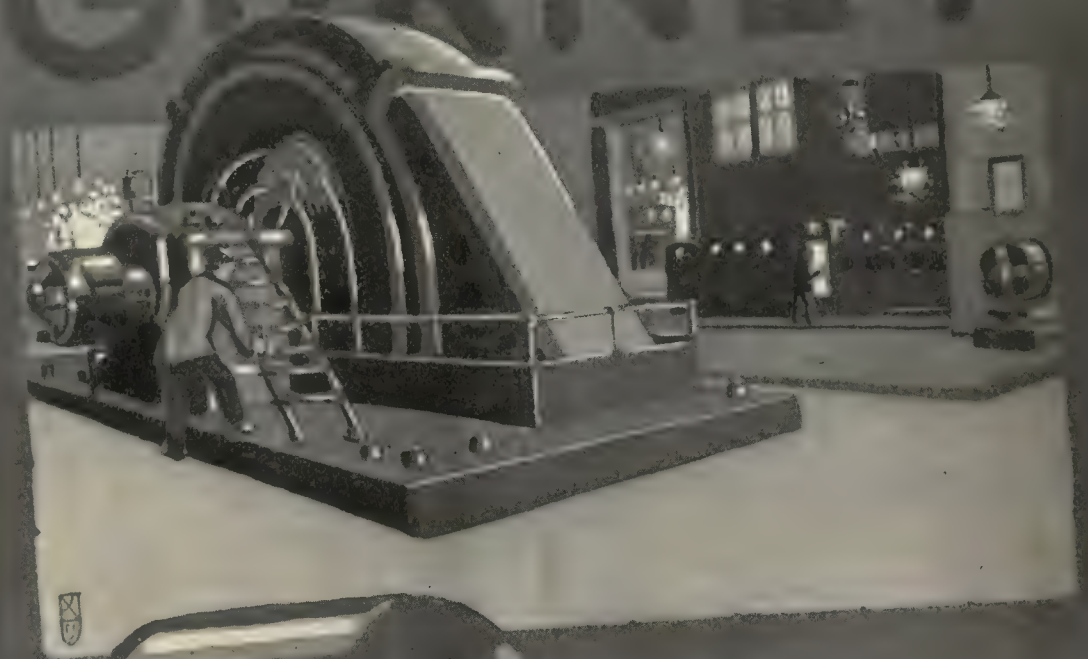
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"CAPACITY"
"ENDURANCE"

—words coupled with Gurney not as a slogan but rather as descriptive of Gurney qualities.

Applied to motors and generators they impart these two qualities so necessary to user-satisfaction.

Specify Gurney as an additional factor of safety.

Gurney Ball Bearing Co.
JAMESTOWN, N. Y.
Chicago New York

A 4000-Page Reference Work on Car Construction

THIS is **not** to introduce a new treatise on the subject of car and truck design—it is merely to remind those connected with or interested in the electric railway field of the existence, in convenient form for reference, of a most comprehensive work containing more than 4000 pages (4056, to be exact) —Brill Magazine. Ten years ago the first issue of Brill Magazine made its appearance as a 24-page publication without a cover and printed for the purpose of telling each month of the cars and trucks that were being built by The J. G. Brill Company. Seven years ago the publication was enlarged to a 32-page organ with a cover and a frontispiece insert. Regularly each month Brill Magazine has made its appearance and thus those who have saved their copies from the very beginning have ready to hand a reference work which we feel justified in calling valuable. The magazine has just closed its tenth year—one hundred and twenty issues — and we feel that during those ten years it has served us well in giving to its readers information on new types of equipment and incidental information on new lines, new methods of operation and improvements in this thing or that thing connected with the railway field. It is our purpose to try and make our magazine an ever increasingly valuable source of information on current phases of car and truck design and upon other topics which are of interest. The contents of the publication are not confined to bare descriptions of cars and trucks but include descriptions of the conditions under which the various types are operated. In addition, in each issue we attempt to incorporate something of general interest and direct usefulness to managers and operators. This material is designed for use in company's pamphlets, pay-envelope stuffers and for all sorts of employe-welfare work. Through our Brill Railway Publicity Service we are coming into direct contact with the advertising problems of the various railways and the information and data which we obtain from this source is constantly referred to in the preparation of material for our magazine. Brill Magazine is representative of four large car-building plants whose products constantly are being developed in the direction of greater safety, comfort, convenience and higher earning power. Each improvement, each step in the development of car design is recorded in Brill Magazine in the hope that it may be of interest and benefit to the field.



Brill Magazine has completed its tenth year in the electric railway field. It will continue along its customary, well-defined path of non-interference with the trade journals of the field.

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Manufacturers of Steam Turbines
Ranging in Capacity from
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RELIABILITY
ECONOMY
General Electric Co
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Car Remodeling in Portland, Me.

ELECTRIC RAILWAY JOURNAL

New York, January 20, 1917 McGraw Publishing Co. Inc. Vol. 49, No. 3 10c a copy

HOUSTON, TEXAS

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At scores of important traffic intersections on the heaviest trucking avenues of New York City by its use, since 1913, of

Alcott Rail Filler and Key Blocks

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Why not reduce the biggest item in your track maintenance, too?

Edward Alcott, Manassas, Va.



Filler Block with Profile of New York Railways Co's 9 in. Girder Rail



Alcott Key Block



Filler Block with Profile of New York Railways

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eavy trucking center at rtlandt and West Stre

work made up of reclaimed gran and Alcott Paving has not

Westinghouse

No. 557

140 Horsepower



The Steam Roads Competitor

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Michigan Railway Company
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527

We have a Standard Motor for every Service.

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ELECTRIC RAILWAY JOURNAL

VOLUME XLIX, No. 3 NEW YORK, JANUARY 20, 1917 PAGES 103 TO 146

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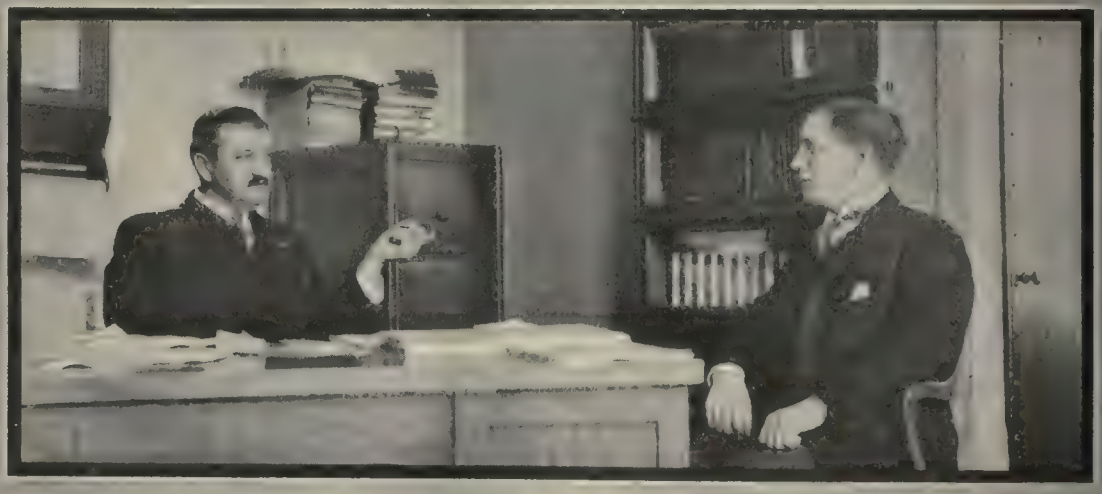
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The Westinghouse Inspector-Specialist is a practical railroad man, direct from the car-barn ranks. He knows the air-brake game from A to Z. Moreover, he knows how to impart his knowledge to others, whether it be to the barn-man to procure the best possible conditions of air brake equipment, or to the motorman to guarantee safety and to improve transportation movement.



"It is largely because of the Westinghouse Inspector-Specialist's close co-operation with our men that we are able to handle our cars better than ever before. His work with our barn-men is equally efficient. The majority of our compressors have never been down since first installed eight years ago, and at present rate of going will hang for eight years more." (Recent remark of a Street Railway Manager.)

Westinghouse Traction Brake Company

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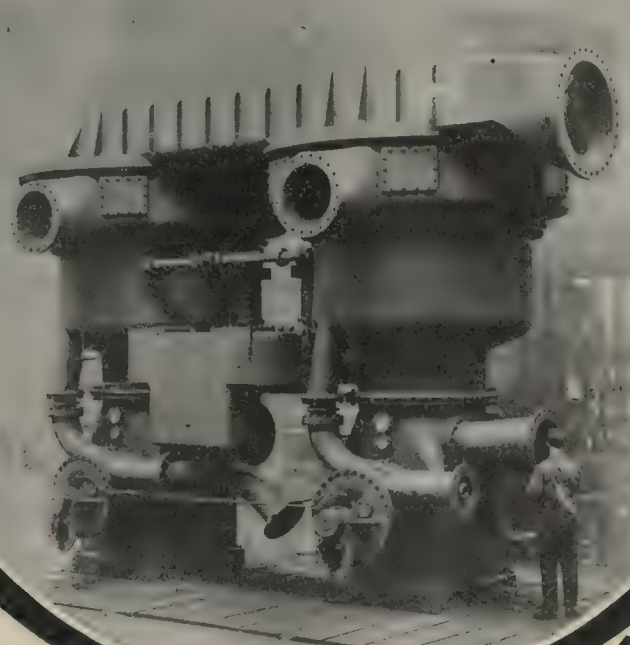
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City Investing Building

ST. LOUIS:
Boatmen's Bank Building

Westinghouse

Jet Condensers



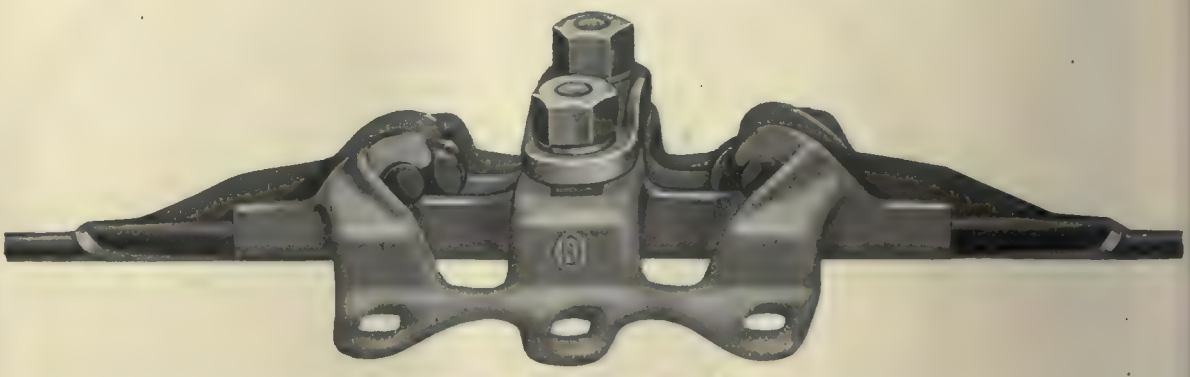
Larger and Larger



Westinghouse Jet Condensers have been sold to serve turbines ranging from 100 to 45,000 kw. capacity.

The choice between Westinghouse Jet and Surface Condensers is a matter to be decided by local conditions.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



O-B Type B Strain Plate

Solid Without Solder

No solder is used in installing the O-B Type B Strain Plate. A single clamp secured by two sturdy bolts holds the wire in a vise-like grip.

O-B Bronze Cam Tips form a gradual approach for the wheel. These tips are slipped under the hooks upside down, then turned over and down on the wire. A few hammer blows clinch their ductile lips around the wire and the job is done.

There are six 9/16-inch strain holes on the O-B Type B Strain Plate. Since they are in the same horizontal plane as the wire there is little tendency for device to tilt should strain be removed on one side.

Description and listing of the complete line of O-B Trolley materials will be found in catalog No. 16.

The Ohio Brass Co.

Mansfield, Ohio





Always Makes Good

Over 200 properties have installed a total of more than 100,000 feet of National Railroad Trolley Guard. Which means that there have been many repeat orders.

National Guard is helping these companies to diminish the risk at those danger zones, grade crossings.

Shaped like an inverted trough, it catches the trolley wheel as it jumps and furnishes power to carry the car to safety.

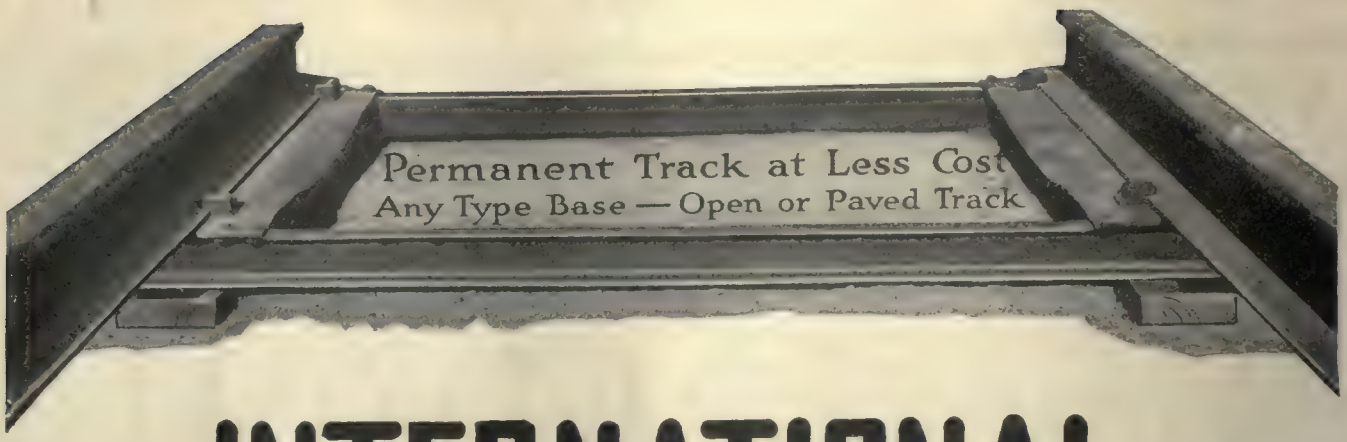
If, only once, it prevents an accident it has more than saved its cost.

Its open wire mesh construction makes its maintenance cost negligible.

Sold Exclusively by

The Ohio Brass Co.

Mansfield, Ohio



INTERNATIONAL
STEEL TWIN TIES

Every Square Inch In Effective Bearing

International Steel Twin Ties are engineering structures, analyzed, designed and constructed on engineering principles.

Every piece of metal in the structure takes its share of the load—safely. There's no waste. The load stress cannot be concentrated at any one point; it is distributed over the entire structure, which presents a bearing area five times in excess of the area required for safety under 50-ton traffic.

Steel channels and steel plates riveted together make up the structure. Cast malleable clips and wedges clamp the rail in place. And there it stays, rail and tie remaining a unit in spite of all the vibration and pounding of hard service.

It's a permanent substructure permitting rail renewals at cost.

Let us submit comparative estimates on your job.

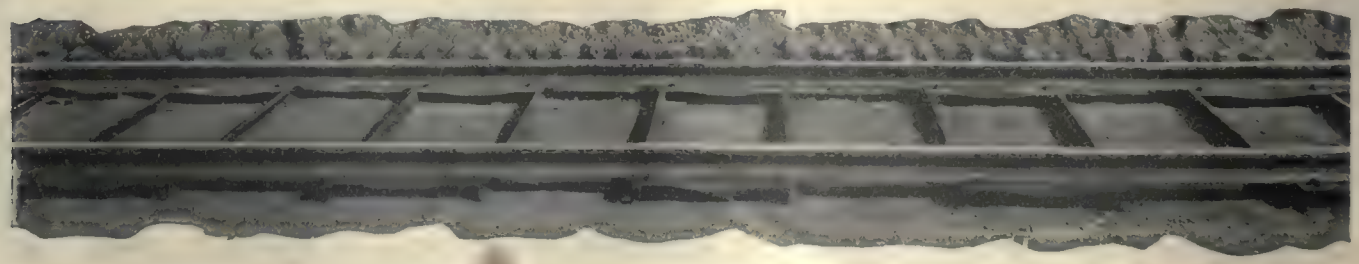
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

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Chicago, Milwaukee & St. Paul Railway Electrification

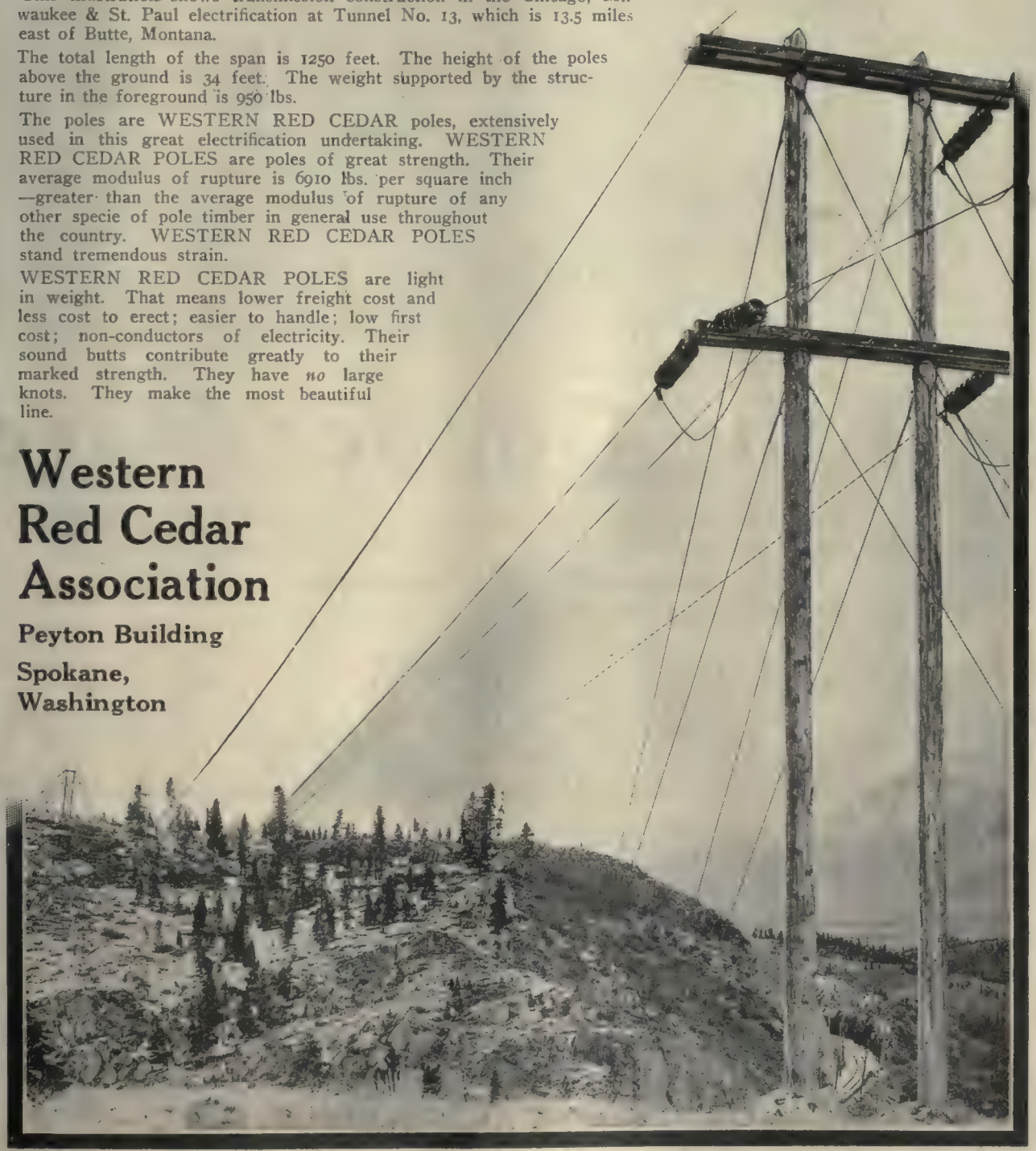
Western Red Cedar Poles

This illustration shows transmission construction in the Chicago, Milwaukee & St. Paul electrification at Tunnel No. 13, which is 13.5 miles east of Butte, Montana.

The total length of the span is 1250 feet. The height of the poles above the ground is 34 feet. The weight supported by the structure in the foreground is 950 lbs.

The poles are WESTERN RED CEDAR poles, extensively used in this great electrification undertaking. WESTERN RED CEDAR POLES are poles of great strength. Their average modulus of rupture is 6910 lbs. per square inch —greater than the average modulus of rupture of any other specie of pole timber in general use throughout the country. WESTERN RED CEDAR POLES stand tremendous strain.

WESTERN RED CEDAR POLES are light in weight. That means lower freight cost and less cost to erect; easier to handle; low first cost; non-conductors of electricity. Their sound butts contribute greatly to their marked strength. They have *no* large knots. They make the most beautiful line.



Western Red Cedar Association

Peyton Building

Spokane, Washington



Exit the Copper Wire

The Union Railway Company, New York, appreciates the merits of Phono-Electric Trolley Wire from its experience with it on Third Avenue, beginning in 1908.

Along several important routes which are now carrying much more traffic than in the past, the company has installed No. 0000

Phono-Electric

—the trolley wire of long life

thus putting off renewals for years and reducing breaks practically to zero!

The illustration shows a part of the 4-mile run of Phono-Electric put up in May and June, 1916, on White Plains Avenue between Gun Hill Road and the city line.

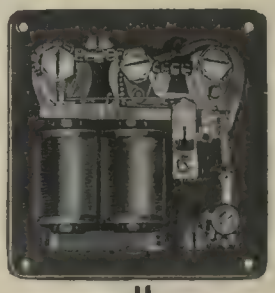
Four lines of cars are run on this street, with a combined headway of approximately 2 minutes. No place for breakdowns!

Bridgeport Brass Company, Bridgeport, Conn.









Don't Use Batteries

The assurance of continued operation of signals and the elimination of the cost of batteries fully warrants the installation of Faraday High Voltage Car Signals on every car. Descriptive matter at your request.
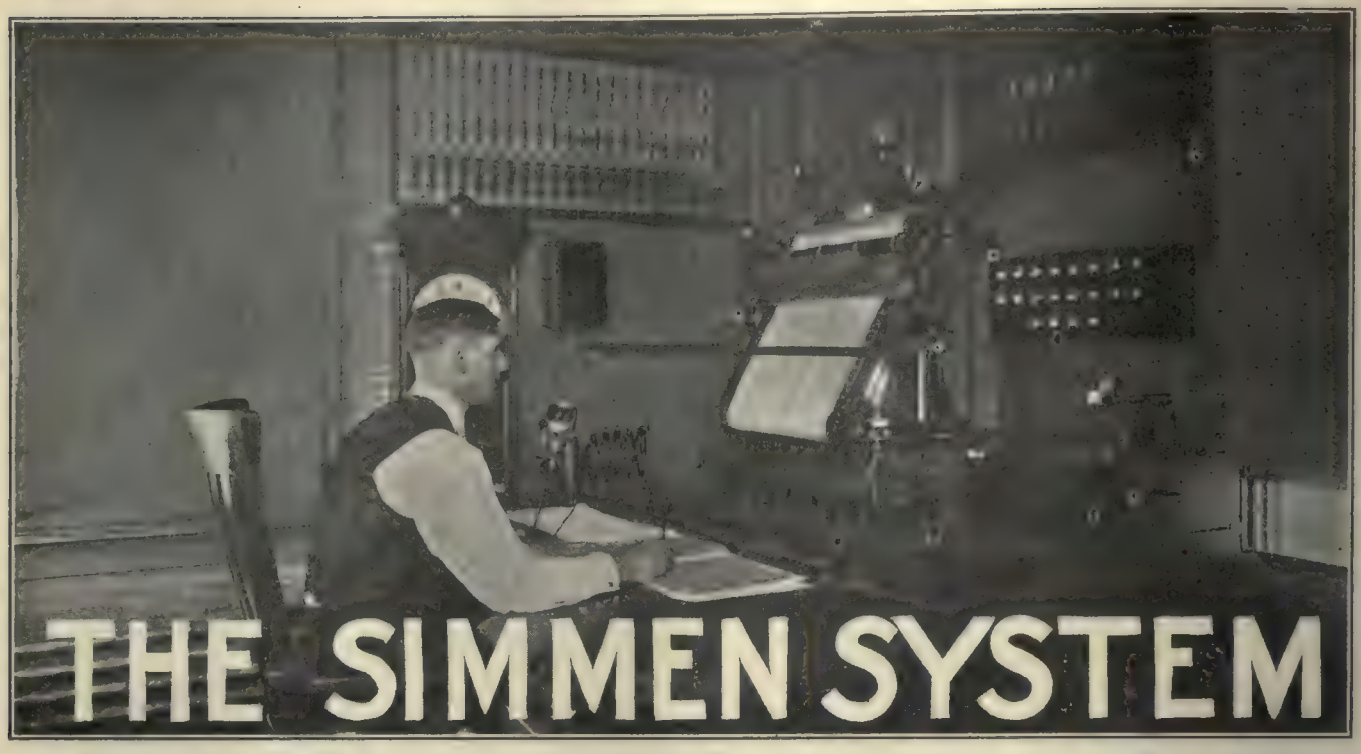
ELECTRIC SERVICE SUPPLIES CO.

Railway Material and Electrical Supplies

PHILADELPHIA, 17th and Cambria Sts.
NEW YORK . - 50 Church St.
CHICAGO . Monadnock Building

Lyman Tube and Supply Co.
Canadian Agents





A Remarkable System of Railway Signaling

For your own advantage, for the interests of your company, and for the benefit of the traveling public, you should be fully informed regarding the merits and technical operation of the Simmen System of Continuous Cab Signals. A brief summary of a few of its features should convince you that it is well worth careful investigation.

CONTROL By means of interlocking control switches the dispatcher can give "stop" or "proceed" signals to the motorman directly in his cab, without intermediate operators or messages.

RECORDS The system provides for an automatic record in graphic form of train movements. This gives the dispatcher full knowledge of the whereabouts of all trains, enables him to direct their movements perfectly, and serves as a permanent record of schedules maintained, speeds, etc.

FACILITY The system facilitates quicker and more frequent train movements, with absolute safety, greatly increasing the capacity of a single-track road. The dispatcher can change a meeting or passing point instantly without the least risk, simply by changing the interlocking control switches in his office. In this way, in case of delay to one train, opposing trains will not waste time waiting for a "meet" and extra trains and other unexpected train movements may be directed with as great facility as the movements of regular trains.

SIMPLICITY Line wire and short contact rails at intervals are the only part of the system installed along the roadway. All apparatus is installed in the dispatcher's office and in the cab under constant experienced supervision.

SAFETY Its operation has proved it wonderfully successful. One of the virtues of the system is the fact that if any part becomes deranged or inoperative, the signal displayed is always that of "danger" or "stop." The dispatcher's signaling switches interlock, so as to make "lap orders" impossible.

COST The first cost is far less than that of the automatic block system, and is in proportion to the amount of traffic.

SIMMEN AUTOMATIC RAILWAY SIGNAL CO.

1575 Niagara Street, Buffalo, N. Y.

Pacific Coast Representative: W. H. Crawford, 609 Spalding Bldg., Portland, Ore.



At
"The Busiest Corner In New England"
Foot-Traffic is Protected, Too

No pedestrian is splashed with muddy water when the switch points are shifted, at the corner of Summer and Washington Streets, in Boston.

The Boston Elevated officials knew that the characteristics of solenoid-controlled switches make for *splashy* operation in wet weather—they *also* knew that their relations with the public would be greatly *strengthened* by splash*less* switch movements at points of heavy *pedestrian* traffic—so they installed the "Collins"

Non-Splashing
Electric Track Switch

—to the entire satisfaction of *everybody.* This highly efficient switch has still other advantages—here are a few of them:

The switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard ears; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.



Not to Be Shaken Off

Like the persisting salesman, who knows that the prospect ought to buy his wares,

is the

ERICO WELDED BOND

Other bonds may make just as good an introductory impression, but for lasting results in the way of high conductivity and resistance against vibration and the elements, the ERICO Bonds excel them all.

The Electric Railway Improvement Co.

Cleveland, Ohio



Pretty strong evidence of two things.

First, that the elimination of corrugations and bad joints **pays.**

Second, that the Reciprocating Grinder does the work thoroughly, economically, and gives the highest satisfaction.

You can prove the accuracy of these conclusions on your own road to your own satisfaction without any risk or expense to your company.

Simply tell us to put a Reciprocating Track Grinder on your tracks for purposes of demonstration and thorough trial.

Then you can keep and pay for the machine, or not, as you please.

You don't have to take our word for the benefits you will get from the use of this machine.

You don't have to rely on the evidence of other users.

You don't have to rely on any preliminary judgment.

Just get a Reciprocating Grinder at work on your tracks and let the **results** do all the talking.

A large percentage of our customers **began** using the Reciprocating Grinder on this basis of **proven** satisfaction.

Railway Track-work Company

30th and Walnut Sts., Philadelphia, U. S. A.



Making the Weld

Rails held in temporary alignment with splice bars and insert in position between heads

The Results of Thermit Insert Welding in Dallas, Texas

exactly parallel to those secured in similar work all over the country—

A return circuit of one hundred per cent conductivity—

A truly continuous rail-joint that adds to the life of both rolling stock and pavement—

An electrical and mechanical connection between rail-ends which will endure as long as the rail itself—because it actually is the rail—

Once the Thermit Insert Weld is installed, it is there to stay—

No expensive opening of street paving for rebonding every year or two—

No revenue losses caused by re-routing for track repairs and rebonding—

No power-consuming, money-wasting leaks in the return-circuit—

The Thermit Insert Weld not only promises, but delivers, perfect service.

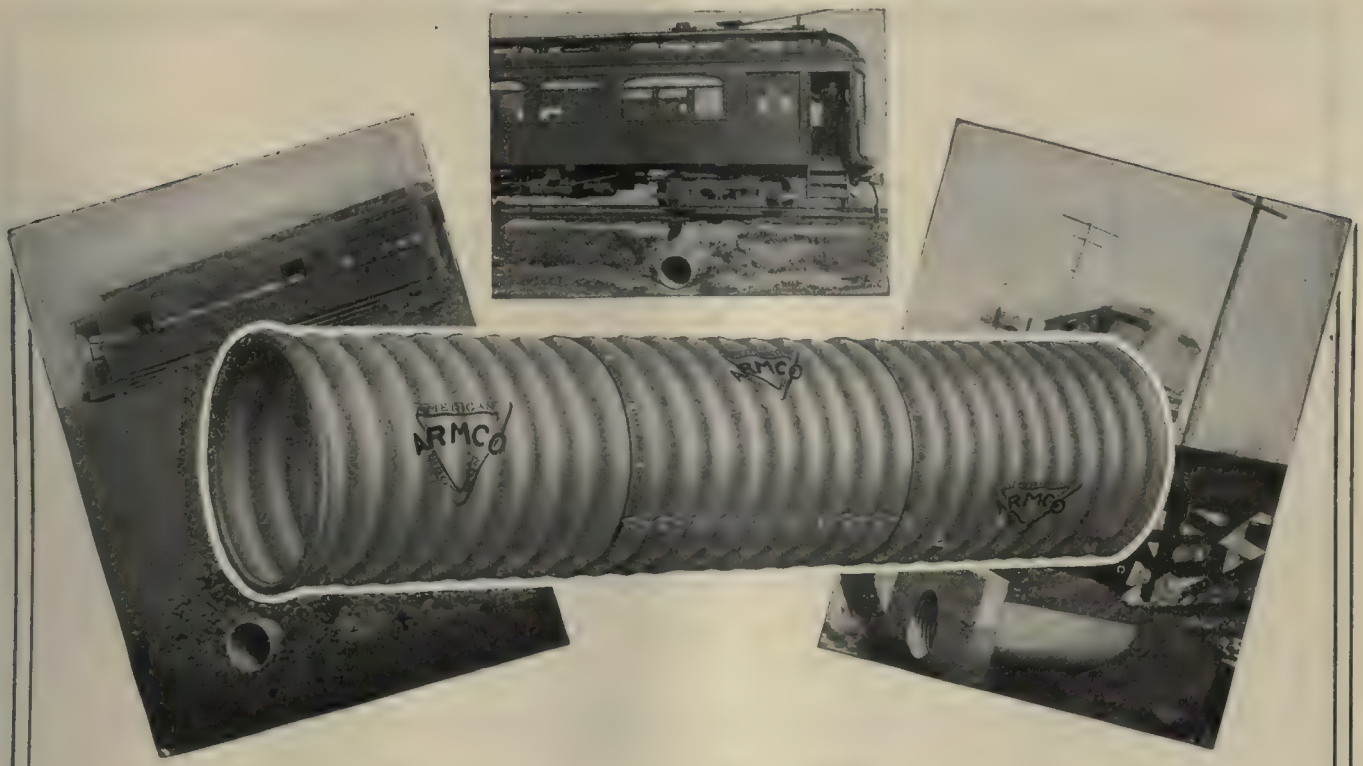
GOLDSCHMIDT THERMIT CO.

120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco

103 Richmond St., W., Toronto, Ont.

7300 So. Chicago Ave., Chicago



Like the Iron of One Hundred Years Ago

Why did the iron of our forefathers resist time and the elements? Why did year after year see it give good service? What were the qualities of this early iron that has come down through a century? **Purity—evenness—and solidity,** the same three qualities found in a yet higher degree in "Armco" (American Ingot) Iron.

ARMCO IRON
Resists Rust

Besides, the corrugated form and interlocking joints of "Armco" Iron Culverts add enormous strength and a resiliency or toughness that enable the pipe to withstand conditions of shifting and settling foundations.

For full information and prices on "Armco" Iron Corrugated Culverts, Siphons, Flumes, Sheets, Roofing, and Formed Products, write the manufacturer in your vicinity.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Corrugated Culvert Co.
California, West Berkeley
California Corrugated Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
Iowa, Des Moines
Iowa Pure Iron Culvert Co.
Iowa, Independence
Independence Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
Kentucky Culvert Co.
Louisiana, New Orleans
Dixie Culvert & Metal Co.
Maryland, Baltimore
Wm. M. Baker, Munsey Bldg.
Massachusetts, Palmer
New England Metal Culvert Co.
Michigan, Bark River
Bark River Bridge & Culvert Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Minnesota, Lyle
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.
Montana, Missoula
Montana Culvert Co.
Nebraska, Lincoln
Lee-Arnett Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
Nevada, Reno
Nevada Metal Mfg. Co.
New Hampshire, Nashua
North-East Metal Culvert Co.
New Jersey, Flemington
Pennsylvania Metal Culvert Co.
New York, Auburn
Pennsylvania Metal Culvert Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Works
Ohio, Middletown
The Ohio Corrugated Culvert Co.
American Rolling Mill Co.
Oklahoma, Shawnee
Dixie Culvert & Metal Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal Works
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
Virginia, Roanoke
Virginia Metal Culvert Co.
Washington, Spokane
Spokane Cor. Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.

PUBLISHER'S PAGE

"Facts, gentlemen, facts"

—Chas. Dickens

IN OCTOBER, 1915, the Miller Trolley Shoe Company installed its first shoes on the Portland-Lewiston interurban division of the Androscoggin Electric Company and on the Allentown-Philadelphia interurban line of the Lehigh Valley Transit Company.

THESE PIONEER INSTALLATIONS gave such satisfaction and economy in current collection that both companies adopted the shoe as their standard for high-speed service. Following this work, the Miller Trolley Shoe Company installed the shoe on a number of other railways to try it out under a great variety of conditions.

THE MILLER COMPANY'S ADVERTISING CAMPAIGN in the ELECTRIC RAILWAY JOURNAL began with a page in the issue of Aug. 26, 1916, and has been continued on a conservative basis.

AS A RESULT OF THIS ADVERTISING in the ELECTRIC RAILWAY JOURNAL, entirely unaided by advertising in other mediums or by personal solicitation, the Miller Trolley Shoe Company had secured **orders from more than 200 properties** up to Jan. 15, 1917.

ADVERTISING IN THE ELECTRIC RAILWAY JOURNAL is the most economical, most effective and most direct way to reach the live men in the electric railway field who know what they want when they want it.

Electric Railway Journal

[Member Audit Bureau of Circulations]



The Central Flare in the Shaped Back of the Hale and Kilburn No. 108 divides the Seat Fairly and gives Comfort, too

"First come, first served" is a practice which can be abused.

Especially when the passenger next the window flows over beyond his fair half of a transverse seat.

That's one reason why some Hale and Kilburn seats with springless backs, like the No. 108, are made with a flare or division, which is at maximum height in the middle of the back.

This shaping is not improperly conspicuous, but it's just enough to assure an equal and comfortable division of the seat.

This shaped back is also a feature of the Hale and Kilburn "Walkover" seats on the famous stepless cars of the New York Railways Company, running on Broadway, New York.

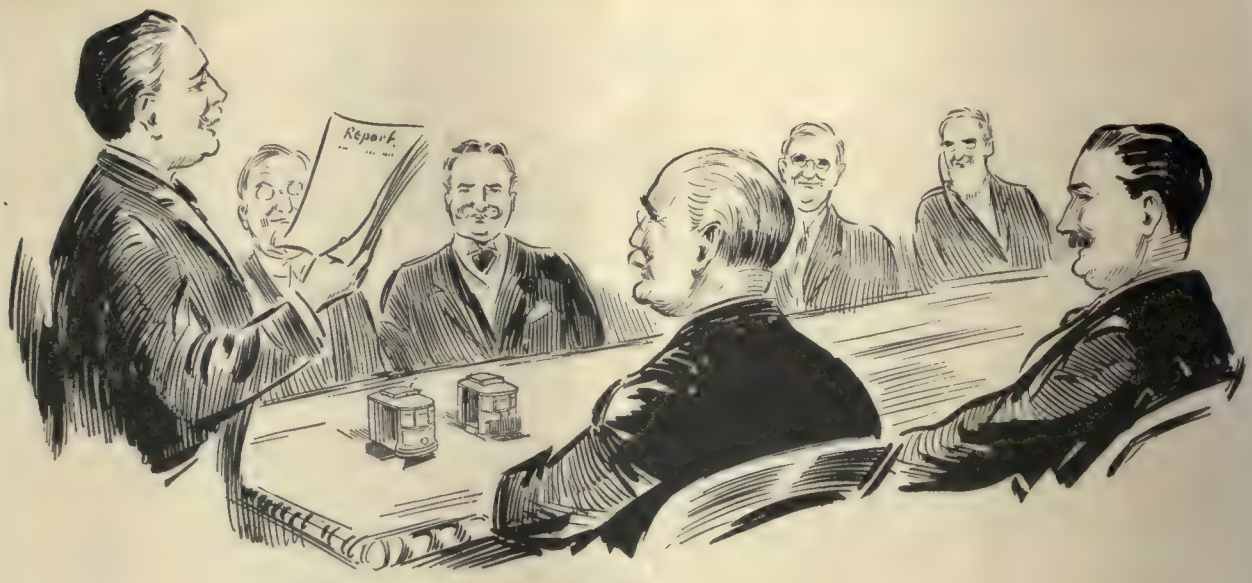
Pioneers in Steel Trim for Passenger Cars, including interior finish, steel doors, etc.

WALKOVER COPYRIGHTED

Hale and Kilburn Co.

Philadelphia New York Chicago
Washington San Francisco

WALKOVER COPYRIGHTED



"In conclusion"

read the General Manager from his annual report to the Board of Directors, "The results shown by H-B Life Guards, on the Marble Avenue line, and Providence Fenders on Stone Street have been most gratifying. During the year they have been in service our accident cost has been reduced by an amount greatly in excess of the first cost and maintenance cost of these life savers. In short, gentlemen, they have more than paid for themselves."

"But," he continued, "H-B Life Guards and Providence Fenders have produced an effect far broader and more far-reaching than mere dollar-saving—they have actually made *friends* for us in the territories served by the Marble Avenue and Stone Street lines, territories which, as you know, were actively antagonistic to the old company from which we bought the system. These folks are *for* us now, instead of *against* us."

"I consider H-B Life Guards and Providence Fenders to be a potent force, not only for reducing accidents, but for promoting better relations —and, as one of the Directors of this Company, I move that H-B Life Guards and Providence Fenders be installed throughout our system."

"And I second the motion," cut in Martin, Cashier of the First National.

"You have heard the motion made and seconded," said the President. "Those in favor of this motion will please signify in the usual manner."

"The ayes have it—gentlemen, I congratulate you, for you have taken a long step toward securing humane and sound prosperity for this property."

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, New York

Sixth of a series of talks on Fewer Accidents and Better Public Relations.



National Pneumatic Door and Step Control is Wanted by Many Departments

Your schedule department wants **National Pneumatic** door and step control because it speeds up traffic.

Your transportation department wants **National Pneumatic** door and step control because it makes life easier for platform men.

Your treasury department wants **National Pneumatic** door and step control because the car will make more mileage and the conductor will miss less fares.

Your claim department wants **National Pneumatic** door and step control because the platform men are in far better position to control passenger movement.

Finally

Your mechanical department wants **National Pneumatic** door and step control because the smoothness, certainty and uniformity of pneumatic machinery replaces the unevenness of human labor—thus conserving the life of the doors and adjacent equipment.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York

515 Laflin St. Chicago



Once installed, the V-K OILLESS TROLLEY WHEEL will run on until worn out without requiring any attention or any expense for lubrication. You'll be saving the roofs of your cars from deterioration caused by dripping oil and the wear and tear of shopmen's feet.

All necessary lubrication is provided by the patented bronze gauze and graphite bushing, without diminishing the wheel's current capacity, such as happens when oil or grease lubricated bearings are used.

Send for illustrated catalog

MORE-JONES BRASS & METAL CO.
ST. LOUIS, U. S. A.

KNOWLEDGE

VS.

GUESS-WORK

To the untrained motorman efficient car operation is a condition to be striven for, but he hasn't the ability to find it for himself. Any progress he may make is hazardous and uncertain; every step toward better operation will be attended by others with the reverse effect. The reason is plain—"guesswork."

ECONOMY METERS
BUILT LIKE A WATCH

On the other hand, knowledge of the principles and methods of good operation makes for success. That knowledge has been collected, tested and placed at your disposal. You can pass it along to the motorman. In return you will get increases in operating efficiency and economy that will astonish you.

Other roads have been doing it for several years and are doing it today—with wonderful results. Economy Meters play the most important part—eliminate the necessity for guesswork, and put facts—knowledge—at the disposal of operatives because their readings give **directly** the actual energy used over a given period of time, or a given run.

Let us tell you all about Economy Meters and the Economy Meter Record System, and show you what they have done for others.

Sangamo Electric Company
Springfield, Illinois
Specialists in Meters for every Electrical Need

Why the Miller Sliding Shoe Saves Your Trolley Wire

Look at your trolley wheels!

Are the grooves filled and the sides spattered with copper?

That copper came off the trolley wire, not through honest wear but through arcing.

Stop the arcing and you stop one of the worst causes of trolley wire destruction.

Scores of low and high-speed electric railways have found that the hugging, sliding contact of the Miller Trolley Shoe does insure this freedom from arcing and from banging at the spans.

And they are cutting their current collection costs way down, too.





We invite you to try out the

Miller Trolley Shoe

on your worst line first!

Miller Trolley Shoe Company

53 State Street **Boston, Mass.**

Sales Representatives:

Holden & White—Chicago
W. F. McKenney—Portland, Oregon
F. F. Bodler—San Francisco, Cal.

S. I. Wailes—Los Angeles, Cal.
Alfred Connor—Denver, Colo.

T. C. White & Co.—St. Louis, Mo.
W. M. McClintock—St. Paul, Minn.
A. L. Sanger & Son—Cleveland, Ohio



Eight Years of Straight HESS-BRIGHT SERVICE on the World's Crookedest Railway



"The Crookedest Railroad in the World"

Across San Francisco Bay lies the beautiful village of Mill Valley, terminus of the Muir Woods & Mt. Tamalpais Railway—the world's crookedest mountain railway.

Within the double bow-knot illustrated is the longest tangent on the road—just 413 ft. In the entire length of 8.2 miles and ascent of 2500 ft. are fully 281 curves.

It is on this marvelous road that a 60-hp. gasoline car with Hess-Bright ball bearings has been running since December, 1909. When this car was rebuilt in 1916, the chassis and the

Hess-Bright Ball Bearings Were Found Good Enough to Stay

Hess-Bright Ball Bearings Are Made to Last in ANY Service

THE HESS-BRIGHT MANUFACTURING COMPANY

Front Street and Erie Avenue, PHILADELPHIA, PA.



Columbia Electric Welding





Big gear cases for electric railway use have to bear big stresses.

They cannot be welded any too well to stand the bumps of poor paving.

That's why we use the best electric equipment available.

And why our electric welding man does little else.

Specialization is the road to perfection

There's a specialist for each and every department of Columbia manufacture.

And that's true of all the items listed below:

TOOLS

Armature and axle straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and field coils
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, rigging, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail contact-shoes and accessories
Trolley poles (steel) and wheels



Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco



The Scleroscope Test for Hardness of Davis Steel Wheels



The wear resisting quality of a wheel depends upon the hardness of the tread and flange. Manganese steel, hard and tough, is used for the rims of Davis Wheels and each wheel must pass the scleroscope test before it leaves our plant.

Thus you are assured that Davis Wheels will stand up under the hardest service and give full life service without grinding, wheel removals, or truck changes and the heavy labor and special machinery expense.

Therein lies your opportunity for real wheel economy—to say nothing of safety. Make the most of it. Put your problem up to us. We'll be glad to send all the data at your request.

Also ask for a copy of our booklet "Making Davis' Wheels." You'll find it interesting and instructive.

DAVIS Steel Wheels

The steel wheel with the one wear tread.
No turning—no trouble with motor clearances.
A hard, tough manganese tread and flange.
A soft, ductile steel plate and hub.
Reduction in weight.
20% saving in weight.
Minimum Maintenance Cost.
Strength—safety—economy.
The steel wheel backed by years of successful service.
You are not expected to adjust your conditions to meet our product. Davis Steel Wheels are made to meet A. E. R. A. specifications and your service requirements.
Write.

American Steel Foundries

1100 McCORMICK BUILDING CHICAGO


COLLIER SERVICE
YOU
are cordially
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to INSPECT
our
NEW
CENTRAL
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220 W. 42nd. St.
NEW YORK CITY
CAR
ADVERTISING
ALMOST
EVERYWHERE
Barron G. Collier
INCORPORATED





Coney Island
Mardi Gras



Brooklyn Rapid Transit System Orders 300 Rico Coasting Recorders

An order placed by either of the New York City rapid transit companies calls for two approvals—that of the operator and that of the Public Service Commission, First District, New York. The Rico Coasting Recorder made good in this way with both the New York Municipal Railway Corporation and the Public Service Commission when we received an initial order for 300.

The power demand of a car of such size in subway and elevated service is worth checking against wasteful and unskillful operation. The Rico Coasting Recorder permits this checking since it embodies

The True Principle for Measuring Operating Efficiency

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



Case Hardening Here Cuts Cost Of Upkeep



The G-E type S, Form L-1 Motorman's Valve has a steel stem, case-hardened at the handle seat. The handle also has a case hardened head.

Wear at the two points most liable is thus reduced to a minimum.

Reduce your maintenance expense by using type S, Form L-1 valves on your straight air brake equipments or on equipments provided with emergency feature.

Ask our nearest office for details

General Electric Company

General Office: Schenectady, N.Y.

ADDRESS NEAREST CITY

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
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Dayton, Ohio
Denver, Colo.
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Fort Wayne, Ind.
Hartford, Conn.
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Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
*Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
St Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Schenectady, N.Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio

*Southwest General Electric Company. †General Electric Company of Michigan

For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.

GENERAL FOREIGN SALES OFFICES, Schenectady, N. Y.; 30 Church St., New York City; 83 Cannon St., London, E. C., England

6699

Electric Railway Journal

Published by the McGraw Publishing Company Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLIX No. 3 NEW YORK, SATURDAY, JANUARY 20, 1917

ELECTRIC RAILROADING IN THE ORIENT

If an American should suddenly be transported to an oriental city he would find conditions very different from those at home as regards dress, customs and housing and social conditions; in fact, in nearly everything which goes to make up the daily life of the individual. Almost the only familiar object would be the trolley car. It is perhaps because electric traction is so recent in origin, or it may be because Americans have taken such an active part in the financing and operation of these lines, but it is a fact that electric railway practice does not differ very much wherever it is found in all parts of the globe. The needs for transportation are omnipresent wherever the community; and the electric railway is necessary even where jinrikishas and sedan chairs abound. So much of the apparatus comes from America or is made along American lines and the industry has developed to such a greater extent in this country than elsewhere that it is not surprising to find American transportation practice followed so far as it is not inconsistent with local operating conditions. In view of these facts, we believe that our readers will be interested in the interview in this issue with C. Nesbit Duffy, vice-president Manila Electric Railroad & Light Corporation, who has a wide first-hand acquaintance with both oriental and American railway conditions.

ORIENTAL AND AMERICAN RIDING

Although the riding and receipts per capita, and consequently the trackage of the system, are not as large in an oriental city as in a city of corresponding size in this country, they are by no means so much less as one might possibly assume. Thus, in Manila, while the rides per capita per year on the railway are only about fifty, it should be remembered that much of the travelling is done by other conveyances, as described by Mr. Duffy. When to the receipts of the railway are added the receipts from these other means, it will be seen that the expenditures rise from, say, $1.50 to about $6 per year per capita for urban transportation in public conveyances. In explanation, it must be remembered that while the per capita wealth of an oriental city is not large, the climate is such as to stimulate riding, and many cities of considerable population cover a large area on account of the absence of tall buildings. Altogether, the receipts per mile of track, as determined by the figures given in the interview, are about $10,000, not a bad showing. From an operating standpoint difficulties and expenses are undoubtedly met in any city so far away from the source of supply, but the lower cost of platform labor should tend to balance the higher material expenses in the operating report. It is interesting to note that Mr. Duffy reports that private automobile competition, from which the railways in this country have suffered, is felt even in Manila.

WARNING AUTOMOBILE DRIVERS

In an effort to co-operate with steam railroads to secure a decrease in grade-crossing accidents, Secretary of State Hugo is mailing out 400,000 "safety-first" pamphlets with the 1917 certificates of registration for New York autoists. These folders, which are furnished by the railroads, direct attention to the increasingly serious character of the grade-crossing problem and urge each motorist to observe more strictly all warning signs. Some autoists, like those whom the Long Island Railroad has found recklessly smashing through safety gates, will probably cast the warning aside with a sneer. The foolhardy, without doubt, can only be completely protected by compulsory means or by threat of heavy penalties. We imagine, however, that the average autoist will be impressed with the apparently official character and personal application of the warning and will bear it in mind at least for a time. At any rate, another move has been made by common carriers to extend the safety-first movement, and thus to lessen the number of unused means by which there is any chance of automobile drivers being brought to a realization of their responsibility for safe operation.

THE LABOR PROBLEM AND EXECUTIVES

We have been much impressed by a recent remark of John D. Rockefeller, Jr., in regard to the modern executive. According to a statement made by him on Founder's Day at Cornell University, the chief executives of important industrial corporations have heretofore been selected largely because of their capacity as organizers or financiers. In his opinion, however, the time is rapidly coming when the important qualification for such positions will be a man's ability to deal successfully and amicably with labor. We firmly believe that this holds true just as much for electric railway executives as for industrial leaders. The day is passing, if it has not gone already, when an electric railway executive can subordinate the labor question to all others and deliberate on it only when he is compelled to do so through the outbreak of industrial trouble. The electric railway industry is confronted now, and will be more seriously confronted in

the future, with the difficult tasks of fixing wages on a more scientific basis, of solving the complex questions of proper hours of labor, of seeing that the public right to uninterrupted service is respected and of trying in general to direct social legislation along sane lines. Electric railway executives must give careful thought to these subjects, for the industry can ill afford to depend on men in other fields to do its thinking for it in order to determine the proper course to follow. The labor problem is nothing more or less than a human problem—the bringing of men with muscle into amicable relationship with men of money for their mutual betterment—but it is a most important one. The electric railway executive will be best suited for his position who realizes to the greatest extent the need of constructive and lasting policies in handling such a problem.

REGENERATIVE BRAKING FOR CITY SERVICE

The fact that stands out most strongly in R. E. Hellmund's remarkably comprehensive treatise on regenerative braking, which was read before the Institute of Electrical Engineers last week and is abstracted on another page of this issue, is that there is an almost infinite number of ways to produce the desired result. In fact, the list of possible systems submitted by Mr. Hellmund for effecting regeneration with direct-current motors alone is fairly bewildering, and one can hardly avoid wonder at the thought of the almost insignificant extent to which the principles have been commercialized at present.

In the discussion that followed Mr. Hellmund's address, the consensus of opinion seemed to be that this present limited number of practical applications is due solely to a lack of refinement in motor design in the past, and one is left with the more or less definite impression that regenerative braking is expected soon to become practically universal. There is, no doubt, reason for much enthusiasm on the subject since the operations on both the Norfolk & Western and Chicago, Milwaukee & St. Paul installations have been such an unqualified success. Yet it is a long cry from these two applications (which, with the addition of a single locomotive on the Lake Erie & Northern Railway and the three-phase engines on the Cascade Tunnel, constitute the only ones in this country) to the use of the principle on the motor cars of city and interurban railways.

Any such adaptation must, of necessity, be of the direct-current type, and direct-current regenerative systems seem to suffer inherently from the complication of separate excitation, this being necessary because of the instability of the universally-used series motor when it is operated alone as a series generator. Simplicity, of course, is of far-reaching importance to motor-car equipment. Indeed, simplicity that can keep at a minimum the vital factors of first cost and maintenance (to say nothing of liability to breakdown) is almost priceless. Complication, apparently, cannot survive, even when relatively great returns or important operating flexibility accompany it, as witnessed by the failure of the really wonderful engineering conception of combined a.c.-d.c. apparatus to perpetuate itself in interurban service.

Of course, the idea of regenerative braking for city cars opens up a marvelous vista of possibilities. Given the hypothesis that complication of apparatus may be altogether neglected, it is unquestionably possible, with a negative booster and regenerative control, to brake down to zero speed and to return practically all of the kinetic energy of the car to the line at every stop. It would then be possible on a large city system to save something like 60 per cent of the power originally used, and to effect an economy amounting roughly to $1,000 per car per year, because in normal city service practically two-thirds of the energy is devoted to acceleration, only to be dissipated immediately afterward at the brake shoes.

Regenerative braking for city cars, in brief, would furnish another answer to the old problem of horse-car days wherein a means was sought by thousands of inventors to eliminate the large effort required of horses when starting a car. The problem to-day is no different except, perhaps, that the pot of gold at the rainbow's end has grown to many times its original size. Then, as now, a remedy for the waste of energy is obvious enough if one neglects the element of complication. But since this is something that cannot well be done in actual practice, we feel that only a conservative attitude may properly be taken, and that any application of regenerative control for motor cars should be preceded by a long and elaborate series of service tests.

BETTER PAY FOR THE MASTER MECHANIC

We have been planning for some time to say a word or two on behalf of a group of men most essential to the prosperity of the electric railway who are by the nature of their work in a difficult position when increases in salary are in question. To come right to the point we think that the master mechanics are, on the average, underpaid, but we have hesitated to say so while so many influences were at work to drain the electric railway's resources. However, we must face the fact that with the increasing complexity of equipment and the necessity for economy in maintenance good men must be held in this class of work and better men developed for it. To this end reasonable pay is necessary, and prospect of ultimate promotion to other departments is desirable. There is no doubt that good work in the shop is appreciated higher up, but the appreciation in many cases does not take the form of cash.

The position of master mechanic in these days calls not only for a high grade of intelligence and all round experience, but there must also be executive ability of no mean order. There was a time, not far back, when almost any good mechanic of foreman timber could be put in charge of rolling stock and its equipment. This time has now passed, but the tradition that the master mechanic should receive a mechanic's wages has not altogether disappeared. The name of the job, honor-

able as it is, rather tends to continue the tradition. In the wage-drawing ranks of the electric railway there has been a more or less steady rise in wages to meet the increasing cost of living. This is necessary to keep the men contented and to meet competition. It is reasonable to expect that the men higher up should be similarly advanced even if they do not assert their rights or threaten to leave their posts for more lucrative positions.

THE PASSING OF A GREAT ENGINEER

The untimely death, on Monday last, of Henry Gordon Stott, superintendent of motive power of the Interborough Rapid Transit Company, removed from the ranks of the engineering profession one of its most useful and eminent members. His technical achievements form an imposing array, so much more extensive were they than it falls to the lot of most successful men to accomplish. Such results could not have been produced by an ordinary man, which he was not in any aspect of his character and acquirements.

Mr. Stott was a natural leader in administrative affairs, as well as technical ones. Although retiring in disposition rather than otherwise, he somehow was obliged to assume positions of responsibility and influence in any organization to which he was attracted by the possibility of rendering himself useful. He had no patience with societies or individuals which were accomplishing no worthy purpose, but unsparingly gave himself to any project, however difficult, which appealed to him as worth while. His counsel was sought because he treated every question as a problem to be solved in the scientific spirit—that is, with sincerity of purpose, broadness of vision and thorough attention to detail. He believed thoroughly in analysis as the basis of progress.

As a place for the training of young engineers the motive power department of the Interborough was a veritable school for post-graduate work. One element in Mr. Stott's success was his ability to attract, train and enthuse a group of assistants able and eager to carry out his technical ideas. His requirements were severe, as he expected deeds not words, but once he found a man with the right attitude toward work and life in general there were no limits to his ambitions for that man. From his assistants he insisted upon having correct results but was always reasonable in his demands, and made all possible allowance for the limitations imposed by the state of the art, by the experience of the investigator and by the facilities at the disposal of the latter. When results of value to the profession were secured, the man responsible for them was encouraged to incorporate them in technical papers for presentation before the appropriate national or other societies.

That Mr. Stott was a mechanical engineer in a very broad sense is indicated by his interest also in electrical and civil engineering. He was recognized as an authority in all three engineering branches. This was natural, in view of the fact that in attacking problems he insisted upon going to their root. Railway men may well feel pride in the fact that he was one of their number.

IMPROVING THROUGH SERVICE

The improvement of through interurban service is essential in some competitive districts if the volume of traffic is to be increased to a point yielding larger net revenue. No general indictment is intended, but a few observations derived from a recent attempt in the East to make an interstate journey of between 200 and 300 miles by trolley are pertinent. In a nutshell, the betterments which seem desirable chiefly have to do with raising the schedule speed (not the maximum speed) and with the articulation of connections at the terminals of individual car service so that long waits are avoided under normal conditions.

A limited-stop service in entering and leaving large cities en route appears essential to the best results. Efforts to carry on a local business with through and fast interurban cars operated for a few miles on large urban traction systems are apt to militate against a satisfactory inter-city journey. What might be called a preferential right-of-way should be given to the interurban cars wherever possible. The use of electric track switches at important junctions passed over by such cars, the discouragement of purely local patronage and the clearing of the line in front of such movements when feasible, as in the holding back of service cars, coal and express matter from obstructing the through unit, are important. Often it is possible virtually to clear a line for through service considerably in advance of the scheduled passing points and without skimping on the local facilities. Those extra quarter hours mean a great deal when the electric road is trying to compete for business with parallel steam lines.

Circuitous entrances into cities for the purpose of getting local business on interurban cars result in saving pennies but in losing dollars, except in those where there is no competition. On a line where forty-five minutes of a two-hour trip between terminals 40 miles apart is consumed in entering and leaving the two principal cities concerned, it is hard to reap the full benefits of the interurban section of the trip, in competition with a parallel steam service covering the distance in an hour, even although the steam fare is double that on the electric, or nearly so. If, by keen study of the terminal situation, from fifteen to thirty minutes can be cut off the trip, the resulting schedule is sure to appeal to business men more than the longer running time quoted above. The extra 50 cents does not measure the value of a busy man's hour in the middle of the day. Finally, the practice of routing incoming through cars slowly around a central park or common before allowing the passenger to reach the principal transfer points is of doubtful benefit. It would seem almost axiomatic that as short an entrance as is consistent with good service should be made into a terminal city and that connections of through cars on trunk lines should be planned with due regard to the possibilities of rapid through service.

Old Cars Remodeled at Portland, Me.

The Cumberland County Power & Light Company Is Converting Its Old City Cars for Prepayment Service with Installation of Folding Doors and Steps—The Work is Being Handled at the Company's Shops Without Additional Facilities

At the present time the Cumberland County Power & Light Company, Portland, Me., is reconstructing its old city cars for prepayment service, including the removal of bulkheads and the installation of folding steps and doors with manual control, so as to provide them with thoroughly modern facilities. Concerned in the change are six single-truck cars with 20-ft. bodies and fourteen double-truck units with 28-ft. bodies. These cars are of the box type, with longitudinal seats, and before alteration they were equipped with fixed steps and interior bulkheads. In addition, two semi-convertible cars of somewhat more modern type have been included in the job. All of these cars are being equipped with combined fare boxes and registers, so placed as to permit pay-within operation.

No specifications or drawings for the job have had to be prepared by the railway company, since the manufacturers of the folding door and step mechanism have been held responsible for measurements, the standard drawings of the latter being filled in from field data secured at Portland and used by the reconstruction force of the railway company in installing the control stands, levers and fittings. The manufacturer ships rods and fittings built for specific cars in stenciled boxes, so that when the parts arrive at Portland their application to the right rolling stock units is assured without delay.

Work was begun on the job at the St. John Street shops in Portland on Oct. 4, 1916, and at present it is about half done. On account of maintenance work on other rolling stock, the reconstruction has had to be temporarily slowed down or suspended at times, the company considering it inadvisable to concentrate a specialized force on work of such limited extent.

In the case of the single-truck cars with 20-ft. bodies, which are representative, the bulkhead door was 21¾ in. wide in the clear before reconstruction, and on these smaller cars the bulkheads have not been wholly removed, but have been cut down to a height of 3 ft. 6 in., the width of the passage into the car from the vestibule being increased to 27½ in. This leaves in place a section of the bulkhead 18½ in. wide on each side of the passage, which affords an arm rest 4½ in. wide at the top.

One of the accompanying illustrations is an interior view showing the "set-up" of one of these cars for one-man service, and although no immediate plans for the operation of one-man cars have been announced at Portland, these remodeled 20-ft. cars can readily be so used if necessary. As shown in an accompanying illustration, the fare box is mounted just behind the right-hand forward bulkhead for one-man operation, the entering passengers passing between the motorman and the box. The motorman controls the entrance door, which is shown open in this view, from an operating handle at the right of the controller.

With two-man operation this door is, of course, used as an exit that is controlled by the motorman, the fare box being located at the other end of the car in a location corresponding exactly to that shown in the illustration. In the latter case the conductor stands between the fare box and the nearer door, which is closed, and passengers enter via the door shown at the left, this being controlled from an operating stand just behind the right-hand bulkhead. The doors are operated in synchronism with the steps below them on all the cars involved in the job. The fare box, which is of International Register Company's make in all cases, is carried 2 ft. 10 in. above the platform.

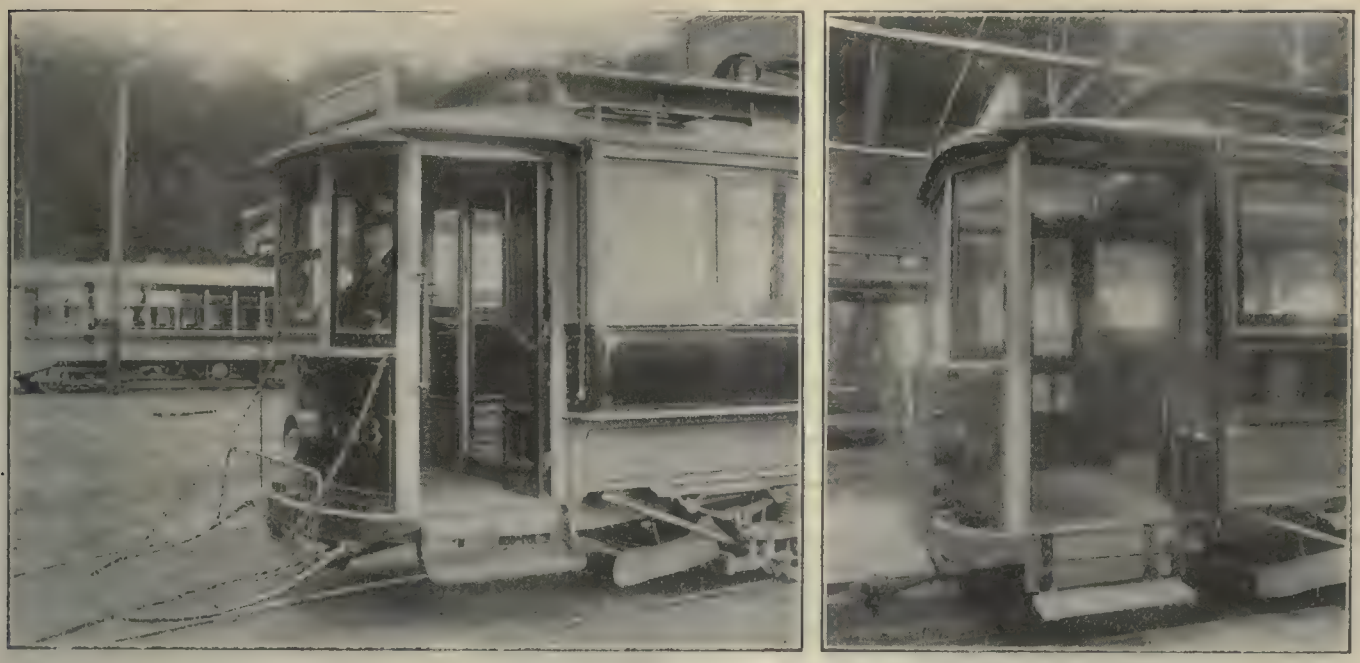
The doors of the single-truck cars are in two sections, the inside section being guided by a case-hardened steel roller, and the doors are arranged to fold outward and hang on 1-in. round steel rods. The outside door opening is 35 in., and the steps are each 2 ft. 7½



REMODELED PORTLAND CARS—INTERIOR OF RECONSTRUCTED SEMI-CONVERTIBLE CAR



REMODELED PORTLAND CARS—INTERIOR OF SINGLE-TRUCK CAR BODY AFTER RECONSTRUCTION



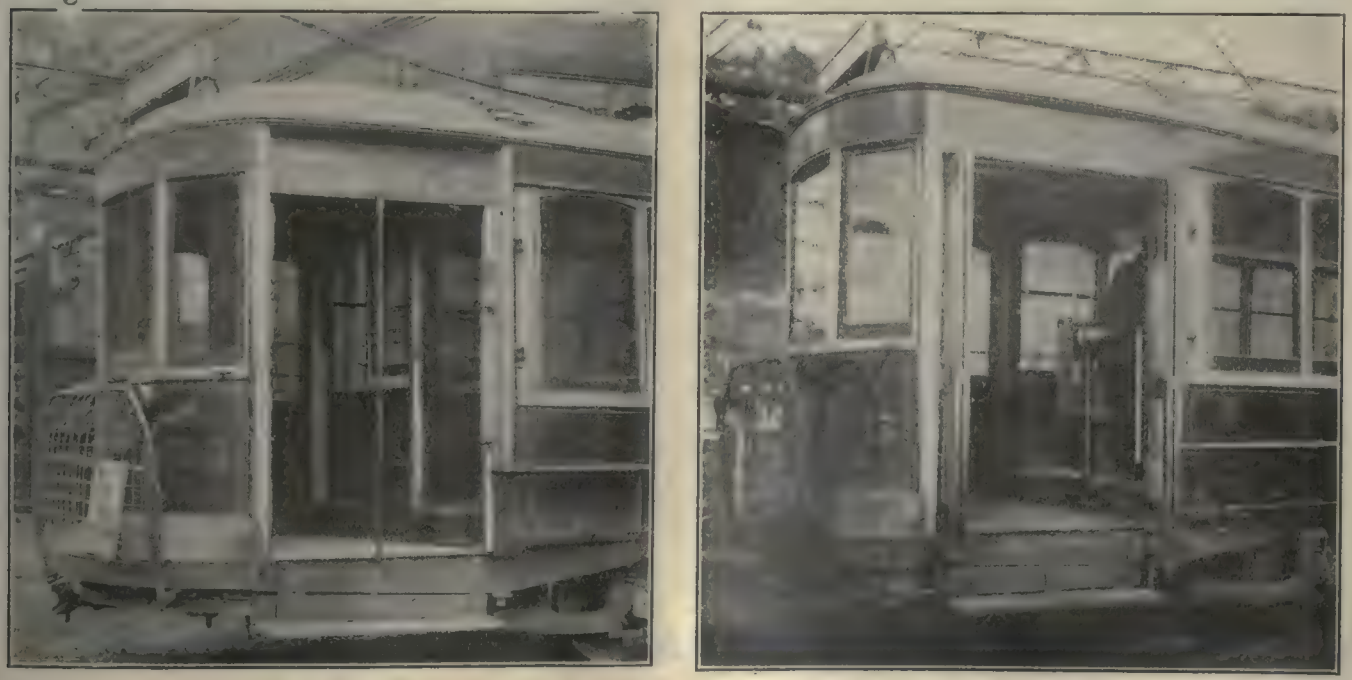
REMODELED PORTLAND CARS—VESTIBULE OF SINGLE-TRUCK CAR BEFORE AND AFTER REMODELING

in. long, 9½ in. wide, being hung from the sill by two wrought-iron hangers. All doors are rendered weather-tight when closed by the use of interlocking joints and rubber packing. Both exit and entrance openings are of the same width, and the doors are provided with three glazed panels each, two of the formerly-used lower blank panels being glazed to enable the motorman and conductor to see the conditions existing outside the step when the door is closed. Four grab-handles are provided in each vestibule, two of these having been added in the reconstruction.

On the 20-ft. cars the snow scrapers have had to be moved back about 8 in. and the drawbars lengthened about 5 in., with an offset of about 4½ in. to clear the door and step-operating mechanism beneath the body. The steps when down are 13½ in. above the rail, the platforms being 13 in. above the steps and the car floor 5½ in. above the platform. Mason safety treads are being used on all steps, which are made of 1½-in. birch.

The car interiors are lighted by five 23-watt tungsten incandescent lamps, and in the reconstruction work these lamps have been fitted with Ivanhoe-Regent shades. In addition, the interior lighting has been greatly improved by applying a coat of white enamel paint to the vestibule ceiling and to the ceiling of the car body proper, including the headlining. Also two 23-watt lamps are installed side by side in the vestibules, and these greatly facilitate alighting and boarding at night. They are mounted directly in line with the passageway from the car interior to the vestibule.

An improvement in effect on all the reconstructed cars is the provision of a motorman's curtain of striped canvas in each vestibule. On the 20-ft. cars the curtain occupies about two-thirds of the width of the vestibule when in service, at other times being folded back at the side and held in place by straps. The curtains



REMODELED PORTLAND CARS—LONG-PLATFORM, SEMI-CONVERTIBLE CAR AS ORIGINALLY DESIGNED AND AS CHANGED FOR PAY-WITHIN OPERATION

are hung on rings carried on a ⅜-in. curved rod, and they terminate at a height of 4 ft. above the floor, thus economizing in material and making their use more convenient for the motorman.

All cars are either retouched or repainted before being placed in service, and the work includes the necessary lettering for prepayment operation as well as painting to improve the diffusion of light within the car body.

Among the illustrations are views showing the vestibule of one of the double-truck, 28-ft. body cars and the vestibule of one of the semi-convertible cars before alteration. The removal of the bulkheads in these two types is complete, as before stated, and although none of the 28-ft. longitudinal-seat cars has been finished at this time, the interior view of the altered semi-convertible car gives an excellent idea of the improvement in both types resulting from the removal of the bulkhead and bulkhead doors. The interior view of the vestibule of a reconstructed semi-convertible car also gives a good idea of the appearance of the two types when completed. In the semi-convertible type the exit door at the right of the motorman's position consists of a fixed and sliding combination leaving about one-half the opening for the use of passengers, but in the 28-ft. city type of box cars the doors are all of the same size and of the folding type.





REMODELED PORTLAND CARS—CONSTRUCTION VIEWS

The reconstructed semi-convertible car has an entrance door opening 4 ft. in width, and the width of the bulkhead arch is 6 ft. 4 in., the vestibule being 5 ft. 6 in. long and the step dimensions on the entrance corners 10½ in. x 3 ft. 11 in. The heights from rail to step, from step to platform and from platform to floor are respectively 18 in., 14 in. and 9 in.

The rebuilt 28-ft. box cars have a bulkhead arch 6 ft. 3 in. wide in place of the former door opening of 2 ft. 4 in. The steps will be 3 ft. long x 10½ in. wide, and the heights from rail to step, step to platform, and platform to floor will be 18 in., 15 in. and 8 in. respectively. For the 28-ft. cars the doors are sawed in two and fitted with new stiles in the alteration to the synchronously controlled type. On the single-truck cars the doors are not split in this way, but are fitted with new hinges and rubber stops. The two semi-convertible cars originally were equipped with folding steps, but these had never been used until the reconstruction made it necessary. In general, the control of doors and steps by motormen and conductors follows the broad lines of design described under the single-truck cars, with the difference that in the large cars the fare box, with one controlling stand, is located nearer to the center of the bulkhead arch than in the smaller cars.

All of the reconstruction work is being carried on by nine mechanics. Ordinarily two men work on the doors, four on the car bodies, and the others on millwork and mechanical installation. Cars arriving at the shop are stripped of doors, bulkhead and old steps; the old doors are then rebuilt, including cutting down and the addition of new stiles. New headers, backing pieces and steps are gotten out, and the inside casing is finished around the bulkhead location. The fare-box mountings are then put on, and the control stands and the door mechanism and step-operating rods beneath the car, which are furnished complete by the National Pneumatic Company, are installed by the forge and equipping departments. The openings that are cut in the door panels are then glazed and the car is painted so far as may be necessary.

In all types the seating capacity remains the same after reconstruction, but the removal of the bulkheads increases the standing capacity somewhat, and even the smallest cars remodeled are singularly easy of access as a result of the changes effected. No changes are necessary in the brake rigging. In general, also, the platform lengths remain as before alteration of the bulkhead opening.

The cost of the modifications, exclusive of the fare-box installation, is estimated to be not in excess of $200 per car, or to approximate $320 per car, including the combination fare box and register. The work is being performed under the direction of E. W. Elgee, master mechanic of the railway company, G. S. Brush being general superintendent of the railway department with headquarters at Portland.

Regenerative Braking*

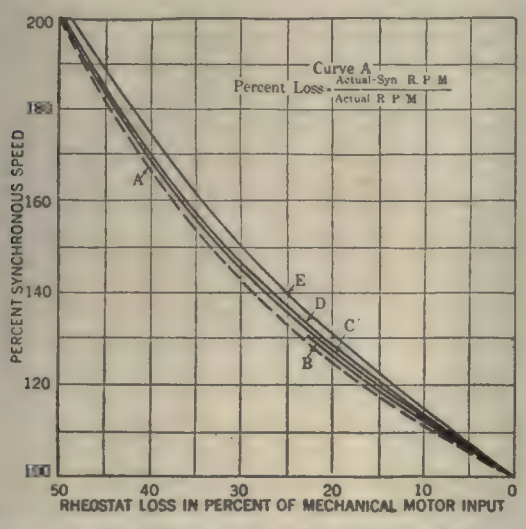
In a Paper Presented Before the American Institute of Electrical Engineers the Author Has Explained in Detail the Advantageous Features and Limitations of Many Possible Methods of Obtaining Regeneration with Different Types of Motor, and an Outline of His Conclusions Is Given

By R. E. HELLMUND
Westinghouse Electric & Manufacturing Company

IN view of the great efforts that have been made to reduce energy consumption by other means, it is rather surprising that regenerative control has not been used to a greater extent in the past. The only reason for this must be that the increased complication and decreased reliability have been considered as outweighing the advantages. With the present advanced state of the art this condition has changed, and although some difficulties have to be overcome with the various operating systems for electric traction, there is no doubt that ordinary requirements for reliability and safety can now be successfully met in spite of some additional complications.

REGENERATION WITH INDUCTION MOTORS

With regard to the provision of the regenerative feature on a three-phase propulsion system, it may be said that the induction motors that are there used will automatically give regeneration so long as they are connected to the line, whether or not such a condition is desired. Regeneration in this case does not introduce any complication whatsoever, and to obtain satisfactory results it is necessary only to provide electrical equipment of sufficient capacity to take care of the regenerative current. In case rotary converting apparatus is used in the system, a certain amount of danger is introduced by the possibility of such apparatus overspeeding if the main power supply is interrupted for some reason or other where there is a train on a down grade to furnish power for the converting apparatus. In such case the train may, of course, accelerate and increase with its own speed the speed of the converter.



REGENERATIVE BRAKING—FIG. 1—RESISTANCE LOSSES FOR INDUCTION MOTORS AT SPEEDS OVER SYNCHRONISM WITH VARIOUS REGENERATIVE LOADS

The proper balance of the regenerative load between the different motors (in case of slight variations in wheel diameter) can be taken care of by the means provided for the same purpose during motoring. Some additional slight complication may be introduced whenever a locomotive is required to descend a grade with a train that involves tractive effort in excess of the locomotive's adhesion. In such a case the air brakes must be worked in conjunction with the regeneration of the engine, and since air brakes cannot be made to exert a uniform torque, it is necessary to introduce a variable resistance into the rotor circuit, which readily permits increases from synchronous speed to speeds of 5 m.p.h. or 10 m.p.h. higher. This involves a loss of energy through its dissipation in the resistance, but that the amount is within reason is shown in Fig. 1. This indicates the rheostat losses in regeneration, the curve *A* covering an approximate general rule while the curves *B*, *C*, *D* and *E* apply respectively to conditions where the actual torque is 75, 150, 225 and 340 per cent of full-load torque.

The increased tendency toward voltage variation that always exists with regeneration is of no great importance in connection with polyphase systems, because all parts of the system can easily stand a voltage increase for the short interval of time during which it commonly exists. In fact, an increase in voltage adds to the torque of the motors and does not impair the reliability of service. At times high voltage will unfavorably affect the power factor, but since it exists only at times of light loads this condition is of no great consequence.

The maximum braking torques are usually limited only by the slipping point of the wheels, since it is possible to keep the pull-out torque of the motors safely above this point. In fact, regeneration tends to bring about increased voltage and increased maximum braking torque, which is, even with equal voltage, larger than the maximum motoring torque, as indicated in Fig. 2. Here the curve *A* covers the condition where the rotor is short-circuited, while curves *B*, *C*, *D* and *E* apply to cases where the rheostat resistance is respectively three, nine, nineteen and twenty-nine times the rotor resistance.

Where slipping of the wheels is liable to occur it can easily be avoided by introducing automatic current-limiting or torque-limiting devices that prevent an increase in braking torque above the slipping point.

With the three-phase system, however, the possibilities for reducing the speed below the synchronous speed of the motors are either very limited in scope or necessitate the installation of cumbersome equipment, and their application in practice does not seem to be very likely in the near future.

The conditions prevailing with a phase-converter system employing a single-phase line and a phase-converter locomotive are practically the same with regard to regenerative braking as with the three-phase system.

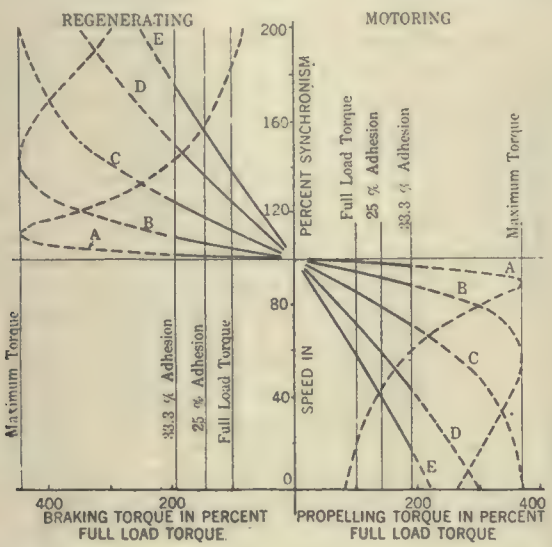
*Abstract of a paper delivered at the Pittsburgh meeting of the American Institute of Electrical Engineers Jan. 12, 1917.

This means that regenerative braking at synchronous speed or slightly higher may be accomplished with ease and safety and without requiring complication of any practical importance, but that the use of regeneration for retardation below synchronous speed is at present either limited in scope or complicated.

REQUISITES FOR DIRECT-CURRENT REGENERATION

The present-day direct-current railway motor lends itself less readily to regeneration than the polyphase induction motor. The series motor, which has generally been introduced in railway work on account of its superiority for propelling purposes, cannot, without additional apparatus, be used as a generator under railway conditions. It is too unstable. In consequence, separate excitation offers the most promising possibility for successful regeneration, even though the addition of a separate source of current for excitation introduces an undesirable complication.

Many different connections and methods of excitation and, consequently, many different characteristics for the generators are made possible by separate excitation.



REGENERATIVE BRAKING—FIG. 2—INDUCTION MOTOR CHARACTERISTICS FOR VARIOUS AMOUNTS OF RESISTANCE IN ROTOR GIVING VARIATIONS FROM SYNCHRONOUS SPEED

Before discussing them, six of the more important requisites for regeneration that have to be considered in all cases may well be outlined.

REQUISTES FOR DIRECT-CURRENT REGENERATION

The first of these requisites is the necessity for avoiding excessive armature currents, especially at higher speeds. With direct-current motors running as generators, high armature currents, even of very short duration, introduce a tendency toward flashing. This is caused by high voltage between commutator segments, the maximum value for which is largely determined by the distortion of the field by the armature current.

With a separately excited generator that runs at high speed with a fixed motor voltage, the field strength must be of necessity very low. But at high speed, and consequently weak field, relatively large armature currents are required to exert an appreciable braking torque under normal operating conditions. This will tend to maintain a material distortion of the weak field, and further increases in field distortion caused by sudden rises of regenerative current in the armature are very liable to lead to flashing. There are two principal causes for such sudden increases of regenerated current. The first of these is the taking of steps in the control. The second and much more important cause is the tendency toward sudden changes in the line voltage. Hence it is very desirable to have such regenerative characteristics as will inherently avoid excessive armature currents.

The second requisite that must be met in all separately excited systems for direct-current regeneration is the question of relative ease or difficulty with which the motors can be connected to the line when regenerative control is desired. Automatic means for producing this result require relays that have to be very exact unless the system that is used is inherently such as not to require a very careful balancing of the voltages before the connections are made. This point is important in the choice of the proper system for regenerative control.

The third general requisite in connection with direct-current regeneration is that the regenerative load must be properly distributed among the various motors of the locomotive. For instance, a slight difference in the air gap of the motors, or a difference in the wheel diameters, will cause a very uneven distribution of load if the armatures of several motors are to be connected in parallel. A good system of regeneration, therefore, has to afford means for balancing the load fairly well between the various motors under practical conditions.

TORQUE-SPEED CHARACTERISTICS

The fourth requisite to be fulfilled is that the braking effect of the vehicle shall not materially decrease with increased speed, nor materially increase with decreased speed, in so short a time that the operator, in case of manual control (or the relays of an automatic control) cannot follow the changes. Sudden large changes of braking torque should also be avoided when changes occur in the line voltage. A case to be considered is that of a train that reaches a section of steeper grade and speeds up to some extent. If, in this case, the generator characteristics should give a decreased torque with the increased speed, the train speed will unduly increase on account of the combined effect of the increased grade and the decreased torque, and this speed increase may reach serious proportions before the engineer has a chance to readjust the control or the air brakes or both. Unfortunately, the desirable condition that the braking torque should decrease with decreased speed, and vice versa, cannot be combined with the machine characteristic that is best for the avoidance of field distortion and motor flashing. On the other hand, the characteristic that is ideal for flashing conditions involves a highly undesirable torque characteristic, and a compromise between the two has to be made.

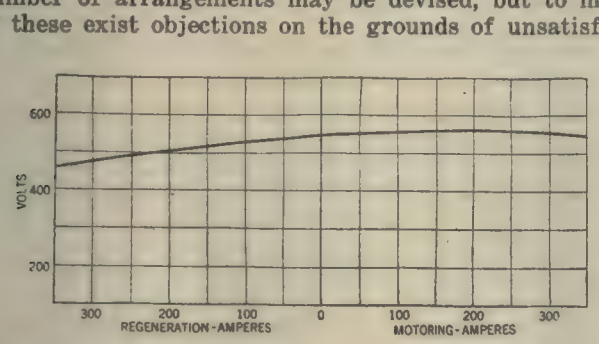
Still another requisite, the fifth to be considered in connection with the various direct-current systems, is the danger of over-voltage on the motors in case the power supply should be interrupted for some reason or other. The natural tendency with most systems fulfilling the previous requirements is, in case of power interruption, for the voltage of the generators to rise until saturation is reached, because the voltage is no longer limited by the line voltage. Since railway motors that operate at high speed as generators are always far from being saturated, it is quite possible to obtain voltage rises of two or three times the normal voltage, leading to flashovers and even to insulation breakdowns. Hence the inherent characteristics of the system should be such as to introduce a time element permitting the over-voltage relays to act before the over-voltage becomes excessive and dangerous. Unfortunately, it is also a fact that those systems which are the quickest to act in avoiding excessive armature current are

usually the ones which are most liable to set up overvoltages quickly in case of power interruption when running at high speed. It is, therefore, again necessary to strike the best compromise.

Finally, in the case of the sixth requisite to be met in connection with direct-current regenerative control, it is necessary to pay much attention to the proper characteristics for the auxiliary exciting apparatus in order to have the system free from troubles. The principal danger is that the auxiliary exciter set, especially the driving part, is subject to flashovers unless precautions are taken in that direction.

POSSIBLE SYSTEMS FOR DIRECT-CURRENT REGENERATION

Subject to the foregoing six general requisites it now becomes possible to discuss the principal characteristics of the source used for separate excitation and the consequent characteristics of the main generator. A great number of arrangements may be devised, but to most of these exist objections on the grounds of unsatisfac-



REGENERATIVE BRAKING—FIG. 3—TEST CURVE FOR STANDARD DIRECT-CURRENT RAILWAY MOTOR SHOWING RELATION OF VOLTAGE AND CURRENT WITH CONSTANT FIELD AND CONSTANT SPEED

tory characteristics. For example, the undesirability of an increase of field excitation with increased regenerative current has already been pointed out. Also, an inherent increase of excitation voltage with decreased line voltage is undesirable because a decreasing line voltage means increased regenerative load, and this load would, of course, be further increased if the excitation was raised at the same time. Practically constant excitation, which might be obtained, for example, with a battery, does not give very desirable characteristics with regard to the limitation of the armature current. Thus, if the line voltage drops suddenly, the regenerative voltage will be much in excess of the line voltage, and there will be practically nothing that will inherently prevent excessive currents. From the test curves of a medium-sized railway motor shown in Fig. 3 it will be seen that, with a voltage drop of only 10 per cent, the regenerative current increases 100 per cent and the ratio of armature to field current goes up in practically the same ratio.

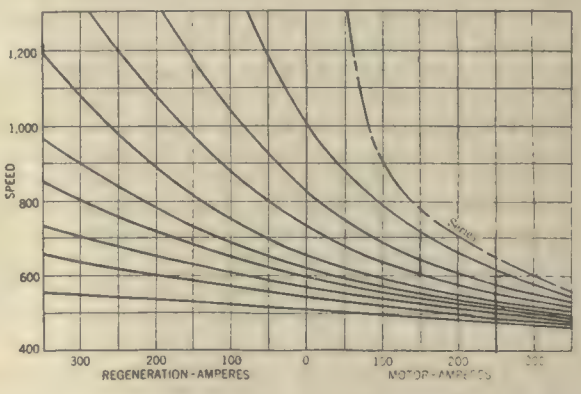
An arrangement in which the excitation voltage varies in proportion to the line voltage provides a very satisfactory system for taking care of variations in the voltage of the line, but it is less so with regard to the steps of the control, because the speed-current and the speed-torque characteristics are essentially those of a shunt machine. Another handicap of this system is that, when the motors are connected to the line, excessive currents are liable to be set up unless the voltage balances rather exactly or unless other precautionary steps are taken, such as the temporary introduction of resistance into the circuit.

The type of system shown in Fig. 5, however, fulfills practically all of the previously enumerated requisites. In this system arrangements are made so that the sum of the regenerative current and the field excitation current of each main generator passes through a common resistance. The circuits are further arranged so that the voltage of this resistance subtracts from the exciter-generator voltage to give the result in voltage of the main generator fields. With this arrangement, if the line voltage suddenly drops, causing an increase in regenerated current, it is evident that the current in the resistance must increase. The voltage of the resistance also increases, and since the voltage of the small exciter either is constant or is beginning to drop with the line voltage, it is evident that the main field voltage (this being the difference between the exciter and resistance voltage) must certainly decrease and cause the field current as well as the field to decrease. This gives a very quick readjustment and a desirable, negative-compound characteristic.

This system is particularly advantageous with regard to connecting the generators to the line. During tests generators have been put on the line with the no-load voltage regulated to 100 per cent higher than the line voltage, yet the maximum current obtained was well within permissible limits. The adjustment of relays, therefore, does not require any great degree of refinement. Also, since each motor has a separate compound effect the system will tend to distribute the load evenly between the motors.

SPEED RANGE FOR REGENERATION

This system, as well as those previously mentioned, are, of course, limited to a certain range of speed over which regeneration can be accomplished. The maximum possible operating speeds are usually limited only by the maximum operating speed of the vehicle, but the minimum speeds are given by the maximum possible saturation of the motors. It is evident that regeneration cannot be effected unless the regenerated voltage is slightly higher than the line voltage. If, therefore, the speed is such that even with fully saturated main fields a voltage above the line voltage cannot be induced, regeneration will be impossible. Since most standard railway motors are fairly well saturated at the one-hour rating, it is usually not possible to effect



REGENERATIVE BRAKING—FIG. 4—CHARACTERISTIC CURVES FOR VARIOUS CONTROL STEPS OF DIRECT-CURRENT REGENERATIVE SYSTEM SHOWN IN FIG. 5

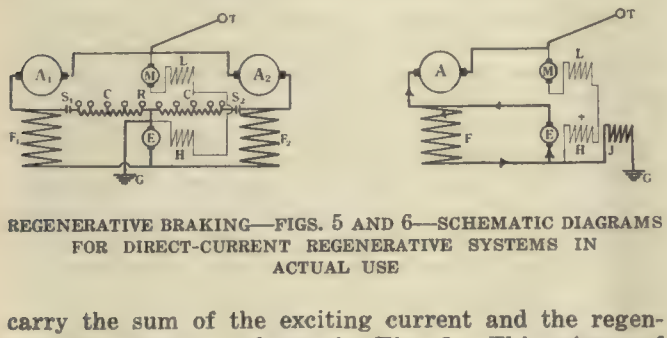
regeneration for speeds much below the standard hourly rating speed. The range of regeneration below this speed can be extended only by reducing the voltage across each motor. This may be accomplished in the same manner as during acceleration, by series-parallel control, or still further by parallel, series-parallel and series control.

The fundamental principles illustrated in Fig. 5 have been very successfully applied to series-parallel con-

trol during regeneration whereby the range for regeneration has been extended from the maximum speed down to about 40 per cent of the hourly-rating speed. The system has also been worked out for manual control with automatic maximum torque requirements, the same connections, without alteration, being used for motoring and regenerating, and one locomotive thus equipped has been in successful operation on the Lake Erie & Northern Railway for the last seven months. In this case no difficulties have been found with main-motor or auxiliary-motor flashing, nor have control failures of any kind occurred, although the operating voltage is 1500 with an occasional maximum of 2000 volts attained during regeneration. The line is 15 miles long and had only one substation at the center during the first four months of operation. [This regenerative scheme was described in the ELECTRIC RAILWAY JOURNAL for Oct. 7, 1916, page 730—EDS.]

MINOR FEATURES INVOLVED WITH DIRECT-CURRENT REGENERATION

Aside from the essential features to be met by an ideal system of control, a great many minor features have to be considered. Among other things it is, of course, desirable to keep the exciter as small as possible in order to reduce the first cost and weight. In this connection three different principles of excitation may be considered. One of them involves having the exciter



REGENERATIVE BRAKING—FIGS. 5 AND 6—SCHEMATIC DIAGRAMS FOR DIRECT-CURRENT REGENERATIVE SYSTEMS IN ACTUAL USE

carry the sum of the exciting current and the regenerated current, as shown in Fig. 6. This gives, of course, a very large exciter with large commutators and numerous brushes. The principal advantage of this system, which has been applied on the locomotives of the Chicago, Milwaukee & St. Paul Railroad, seems to be that it avoids the necessity of connecting the motors to the line as generators. The arrangement is such that the motors are connected to the line in the regular way, at first as motors. Subsequently the exciter is connected across the field and raises its excitation until the motor voltage overcomes the line voltage and regeneration takes place. This requires the manipulation of two separate handles and does not permit series-parallel control without interrupting the braking torque. The second general principle of excitation is that wherein the exciter set carries the field current only, giving an exciter of small current capacity. This principle is used in the system shown in Fig. 5. The third principle makes use of an exciter set carrying the difference between the field current and the regenerated current, which provides a further opportunity for reducing the average current in the exciter, but which involves disadvantages such as that the exciter works at times as a motor, this leading to difficulties with flashing in the driving machine.

A great many other possible systems for direct-current motors are available, even with the fixed voltages herein considered, and there are further possibilities for regeneration if motor voltage is made to vary from that of the line, this permitting regenerative braking down to zero speed. Such voltage variation is easily made possible through the use of booster armatures connected in series with the main armatures and arranged so that the voltage subtracts from the line voltage. Booster equipments provide several advantages, such as the opportunity for acceleration without rheostatic loss, but there are numerous disadvantages that tend to offset this.

In general, it may be said that the result of regeneration upon direct-current lines may at times be rather disadvantageous with regard to fluctuations in line voltage. With low-voltage systems having a low density of traffic, voltage rises of 15 per cent above the maximum voltages otherwise obtained are not at all unlikely. Regeneration may also be disadvantageous where non-commutating pole apparatus is installed in existing substations. Such machines depend upon a certain shifting of the brushes to commutate successfully, and when the current reverses, the brush shift is in the wrong direction and rather bad commutating conditions will be obtained.

ALTERNATING-CURRENT COMMUTATOR MOTOR SYSTEMS

Since alternating-current commutator motors are always provided with cross field-winding to prevent armature distortion, and since they always have relatively low commutator voltage, the flashing difficulty is largely eliminated and the danger of over-voltage is minimized. The existence of a transformer on the car or locomotive makes variation of the voltage on the motor very easy, so that weakened fields at high speeds are not a necessity and regeneration at all speeds down to a standstill can be accomplished. On the other hand, additional problems are introduced because the characteristic of the regenerating voltage must be right, not only with regard to its size but must also be correct in phase. Another difficulty is to obtain proper commutating characteristics for all speeds during regeneration, this latter problem being generally identical with the commutating problem of single-phase motors during acceleration. A practical application of a system in which exciting current was furnished by an alternating-current generator was made on a locomotive built several years ago for the Midi Railway in France. This machine was equipped with only two large motors, one of which was used as an exciting generator for the other motor during regeneration. The system worked very satisfactorily, but was later abandoned by the railway company in favor of dynamic resistance braking because there was an abundance of water power available and because no saving whatever could be effected by the use of regenerated current.

The difficulty of connecting alternating-current generators to the line is materially reduced as compared to direct-current motors, because the inductive effect of an alternating-current system materially reduces the tendency toward current peaks. The introduction of a certain amount of compound characteristic by the means previously described will, of course, further assist in keeping down current peaks. As a rule, satisfactory commutation can be obtained in all cases during regeneration, although certain complications in the control may have to be introduced for this purpose.

[In Mr. Hellmund's paper no less than twenty-one different possible systems for regeneration were described and illustrated by diagram. Unfortunately, space limitations prevented the publication of these descriptions with the exception of the two most prominent, of which one displays the principle adopted by the Chicago, Milwaukee & St. Paul Railway and the other that installed on one of the Lake Erie & Northern Railway's locomotives.—EDS.]

A.I.E.E. Discusses Regenerative Braking

At the Pittsburgh Meeting of the American Institute of Electrical Engineers the Entire Session Was Devoted to R. E. Hellmund's Treatise on This Subject

THE 328th meeting of the American Institute of Electrical Engineers was held in Pittsburgh, Pa., on Jan. 12, 1917, under the auspices of the Pittsburgh section of the Traction and Transportation Committee. The session was called to order by President H. W. Buck, who introduced R. E. Hellmund, Westinghouse Electric & Manufacturing Company, as the speaker of the evening. Mr. Hellmund then gave a forty-minute abstract of his paper on regenerative braking for electric vehicles, which is published in condensed form on the preceding pages.

Robert Lundell, consulting engineer, New York City, opened the discussion by telling of some of the pioneer work with which he had been connected. In 1895 he experimented with a small compound-wound motor having two armature windings and two commutators. It was possible to connect the commutators of each motor in series or in parallel and thus he got great flexibility of control for regenerative purposes. He also described tests made in 1902 at Newcastle in which the regenerative equipment used 25 per cent less energy than the standard equipment. During the test he was acting as motorman and was following a car having the standard equipment. This car suddenly stopped and Mr. Lundell threw his controller to the braking position so quickly that the regenerated current exceeded the 200-amp. for which the breakers were set and they opened, thus destroying the braking effort and causing a collision, which, however, did not prove to be serious.

He had hoped to find in Mr. Hellmund's paper some actual data on the amount of energy saved, and gave some figures which showed that a regenerative equipment had accomplished a net saving of 30 per cent over the energy used by standard equipments. The tests showing this saving were made in Germany in 1906.

E. W. Alexanderson, General Electric Company, said the work that had been done on regeneration had proved the fundamentals he had laid down when he took up the work. These were that the proper dynamo to use where regeneration was to be accomplished was one having a volt-ampere characteristic which would give electrical stability, and a speed-torque characteristic which would give mechanical stability. He defined stability as a condition such that the result of a change would not tend to produce a greater change but would tend to reduce or resist the change itself. Several sets of curves were displayed to illustrate the mechanical and electrical characteristics of different motors with various methods of regeneration.

David Hall, Westinghouse Electric & Manufacturing Company, in his discussion emphasized the importance of designing the master controller so that both acceleration and regeneration would be established gradually, and that the transition from motoring to regeneration should be accomplished without opening the circuit. He said that the problems of control had been chiefly responsible for keeping out of practical operation most of the systems of regeneration except those on three-phase lines. A discussion written by R. E. Ferris, was then read in which it was pointed out that the improvements in railway motors had reached such a stage that it was necessary to provide for regeneration in order to go on with the work of making more efficient motors.

W. V. Turner, chief engineer Westinghouse Air Brake Company, said that regenerative braking would not replace air brakes, and that while regenerative braking is needed for economy, air brakes are necessary for safety. He pointed out that with regenerative braking and no air brakes it would take as many locomotives to take a train down a grade as to pull it up the same grade. In other words, the pusher locomotives could not be cut off after ascending a grade when a descent of a similar grade was to follow. He also showed that even if the helper locomotives were left on for regenerative purposes they would not be in the proper position in the train for braking since the proper pushing and braking positions were not the same. He said that the regenerative braking system should be so interlocked with the air brakes that, should the regenerative braking fail or should the speed tend to exceed that which would be safe for air-brake operation, the air brake would be automatically applied.

H. M. Hobart, of the General Electric Company, described in an interesting manner the history of the regenerative braking developments. He said that much of the early work was done in England, and that the first successes were attained there. Due credit, he said, should be given to Frank J. Sprague and E. H. Johnson for their pioneer work in the field.

F. R. Phillips, superintendent of equipment, Pittsburgh Railways, was then called on as representing the American Electric Railway Association. He said that car developments in recent years had caused reductions in the car weight of 45 per cent, and that electric railways had come to learn that this meant a material saving in their power bill. Consequently, the railways would look with suspicion on any plan which called for such an increase of car weight as those outlined at the meeting. Each ton added to the weight of a car cost about $70 per annum for power alone.

As opposed to this view Prof. C. A. Adams, of Harvard, remarked that this extra energy necessitated by extra weight would be returned to the line during the braking. Following this a discussion by C. F. Fortescue was read. His plea was for the constant speed motor for heavy electric traction. This type of motor lends itself most readily to regenerative control and made it easier to maintain a higher average schedule speed. However, regeneration was possible on any system except those using mercury arc rectifiers.

N. W. Storer, Westinghouse Electric & Manufacturing Company, then read a discussion by W. B. Potter, General Electric Company, which took up the problems of d.c. regenerative systems, since, as he said, the a.c. problems had been pretty well solved. He called attention to the fact that a machine such as a series motor having good and stable characteristics, when worked as a motor, had poor and unstable characteristics when worked as a generator. He concluded saying that Mr. Hellmund's paper could be amended by saying that the developments of regenerative braking had reached a point where the new method of operation was of great commercial importance. Mr. Storer then discussed the subject himself, stating that the standard series motor must always be used on account of its inherently good motoring characteristics. The early experiments in regenerative braking had been unsuccessful mainly because the engineers were using shunt motors. Ways could be found of making the series motor more stable as a generator, and if it did give insufficient braking occasionally, with the air brakes there was nothing to worry about. In other words, air brakes should take care of the emergencies. By a series of curves he showed in a striking manner the economy of regenerative braking, at what speeds it was practical to use re-

generation and the amount of energy that could be saved.

Mr. Hellmund in closing the discussion said that the co-operation of the railway men with the manufacturers was essential in working out the problem, and that he believed that the railroads would come to see that the constant speed motor was what they want.

Electric Railway Transportation in Manila

C. N. Duffy Explains the Problems Which Differentiate Street Railway Service in the Orient from That in the Occident

C. NESBIT DUFFY, vice-president, Manila Electric Railroad & Light Corporation, who is now in the United States for a short stay, gave a very interesting talk recently to the editors of the ELECTRIC RAILWAY JOURNAL on some of the peculiar conditions surrounding the operation of the Manila electric railway system. Some of the most important points which he touched upon are given in the following paragraphs.



C. NESBIT DUFFY

In the first place it should be understood that the orientals had solved their transportation problems in a fairly satisfactory manner long before electric railways were even dreamed of. In Manila the very moderate requirements for local transportation was met by street rigs, principally of the two-wheeled variety, drawn by native ponies. In Japan the jinrikisha met a similar need. When, therefore, the J. G. White Company decided to enter the transportation field in Manila, they found the population fairly well satisfied with the facilities for getting about. The company required a vision of the future development which modern railway equipment in Manila would bring about in entering this already occupied field. Now the city has a modern system which it supports reasonably well.

SPECIAL DIFFICULTIES HAD TO BE SURMOUNTED

One of the difficulties incident to the necessity for providing for two classes of the population is the division of the car space into first and second-class sections. This has been solved by dividing each car into two sections by means of a barrier, a suitable proportion of the space being reserved for each class of passengers. The practice is for the first-class passengers to enter and leave the front, while the second-class passengers use the rear.

A more serious matter is the safe operation of the cars in the narrow, crooked, congested streets. Not only are the streets narrow, but the sidewalks are correspondingly narrow at times, forcing pedestrians to walk in the roadway. The density of population in some parts of the city is also very great, resulting in crowding of the streets and the use of the roadways as playgrounds for children. In spite of these adverse operating conditions, the number of street accidents in Manila is very small, which fact is recognized by the population as very creditable to the native motormen.

Climatic conditions in this region are favorable for the transportation in some respects, but impose difficulties in others. While the average minimum temperature is about 72 deg. Fahr. and the maximum 88 deg., the rainy season extends for three months between July and October, and the typhoons bring terrific winds with the rain. It is quite a problem to provide cars which will be comfortable in respect to temperature and at the same time provide protection from the typhoons. During the storms the wind also causes obstruction of the track by blowing down branches of trees, and interference with power transmission. In spite of these special difficulties, however, the company is able to maintain reliable service by adapting its equipment to the local needs. The entire train force is recruited from the Filipino population with the exception of the superintendent and assistant superintendent of transportation. Many of the men have been in service since the road was opened in 1905, and as operators they compare favorably with motormen and conductors in cities of the United States.

A rather peculiar situation faced the company in connection with the eating habits of the natives. The Filipinos are small but active, and they make excellent linemen as well as platform men. However, they are inclined to eat at all times of the day, and have a fondness for sweets. The management realized that good food is the basis of good service and accordingly made provision for a company restaurant. This was particularly needed in the rainy season. Accordingly a section of a carhouse was fitted up for restaurant purposes and leased to a Chinese at a nominal rent. The company controls the standards of service and food, so that the men now get excellent food under proper conditions and at reasonable rates. This restaurant is operated twenty-four hours a day every day in the year.

TRANSPORTATION COMPETITION IN MANILA

There are more automobiles in Manila than in any other city in the Far East, including quite a number in public service. In addition there are the pony-drawn rigs already referred to. The total number of street rigs competing more or less with the railway is about 4000, and these are estimated by the company to have carried 17,000,000 passengers in 1915. This total is about the same as the electric railway business. The street rigs will accommodate about three times as many persons as can be seated in the street cars. The street rigs are estimated to have collected in fares in 1915 about two and one-half times as much as the railway. These estimates are made by the railway management partly on the basis of the taxes on receipts paid by the street rigs.

The street rigs vary in size from the two-wheel vehicle seating two persons to buses seating twenty or more. The municipality prescribes the rates which can be charged for rigs. By the hour the charge is 40 cents in gold for first-class, and 20 cents per hour for second class. The drivers will haul single passengers for less than a mile for 5 cents gold and from one to two miles for 10 cents, additional passengers being carried at reduced rates. The average fare per passenger is probably about 10 cents.

In comparison with the fares charged by the street rigs, the railway fares are as follows: The first-class cash fare is 6 cents, ticket fare is 5.5 cents. The second-class cash fare is 5 cents and the ticket is 4 cents. A 3-cent fare without transfer privilege, a voluntary concession by the company, is accepted up to 7 a. m. The average fare per revenue passenger is approximately 4 cents, and with transfer passengers included approximately 3 cents. All of these fares as quoted are in gold.

At present about one-half of the cars are of the open type, but the preference is for closed cars. The reasons for this will be clear from the statements already made and also when the difficulties of fare collection are considered.

The company is using every opportunity to utilize its equipment efficiently. Bi-weekly company confer-

ences of officials and department heads are held for the purpose of discussing general problems, and in the intervening weeks departmental conferences are conducted with special attention to details.

The joint company section of the American Electric Railway Association and the National Electric Light Association is of great value in promoting a company spirit. The section in Manila has now 118 members and is doing excellent work along educational and constructive lines, as is evident from the reports appearing from time to time in the columns of the ELECTRIC RAILWAY JOURNAL.

Maintaining a Continuous Property Inventory

Such a System Makes Value Figures Readily Available for Various Uses—Substitutes Facts for Guesswork in Figuring Operating Costs

By HAROLD BATES

Assistant Construction Engineer The Connecticut Company, New Haven, Conn.

THERE are very few electric railways on which improved methods and decreased annual expenses could not be secured if sought for in a scientific manner. The first step, for any company that desires to increase its efficiency, is to determine where and how inefficiencies exist. This necessitates true cost figures that can be analyzed and compared. In calculating such costs, however, interest on the investment and depreciation must be considered, these in turn being based on a knowledge of the detailed property investment or value. It is thus evident that a system which will maintain and show at all times the detailed property value is of the utmost importance in the study of the efficiency of electric railway operation.

BENEFITS OF A CONTINUOUS INVENTORY

In general, the benefits to be derived from the institution of such a system as indicated above, *i.e.*, a continuous inventory of railway physical property, may be classed under two general headings:

1. The ready availability of the figure for the value of any part of the property, and the actual time saved in looking it up, when such information is required for insurance, rate cases, issuance of securities, check on renewals, reports to utility and tax commissions, etc. In this way the inventory is in itself efficient.

2. The substitution of facts for guesswork in the figuring of all operating costs, because of the availability of detailed property values. In this way the inventory is essential to increased efficiency in operation.

PRESENT PROPERTY RECORDS ARE INEFFICIENT

The property records, as they are now kept by most companies, are not efficient in furnishing information for the various purposes outlined under the first heading. In connection with all early acquired or constructed property many companies have very meager records, or records not classified in any detail by accounts. In such cases it has been necessary to make an appraisal in order to determine the value of property units, but after this the values of the various units have not been maintained up to date. An inventory has been lacking, and it has been necessary to hunt through records of expenditures to determine what, if any, changes have occurred in the property since the date of the appraisal.

The property records of later and present-day work are, of course, in more nearly complete form, and the actual cost will usually be found distributed by account numbers under a work order or authorization-for-expenditure number. Such records have their shortcomings, however, for it is sometimes found that when the cost of a certain section of the property is desired, this section represents expenditures under a number of orders or authorizations. On the other hand, it may represent only a part of the property covered by one authorization. In such cases the amounts shown have to be added or separated, as the case may be, before the desired figure can be ascertained.

Yet, even if the existing records as maintained by the accounting department were complete and covered the property section desired, there would still be an essential difference between such records and a perpetual inventory. In the former case the property would be recorded by the dollars and cents expended to produce it and would be classified in certain general groups. In an inventory, however, the property would be recorded and classified by the units that are usually dealt with in practically all problems pertaining to railway operation. For example, to find the cost of a power-station building, it is necessary under the present methods of accounting first to determine how many authorizations for expenditures were issued which included items entering into the makeup of this building, and then to pick out and add such items. In a continuous inventory, this building would be maintained as a unit, its total value being corrected as additions and betterments and retirements were made. The old questions—"How much does this expenditure cover?" and "Are you sure that all expenditures have been included?"—are not necessary when one is looking up property in an inventory, as values are recorded by the units of property usually called for.

A continuous inventory system, such as that outlined in the 1916 report of the engineering-accounting committee of the American Electric Railway Association, would, if adopted in full, obviate all of the foregoing defects of the present method of handling property records and would show at any time the various kinds of property in detailed sections, as well as the value, up to date. By full adoption of the inventory system is meant the inventorying of the entire property, the appraising of those parts for which there are no cost records and the segregating of all values into the desired sections and units. If a company does not desire to undertake the expense of an appraisal at once, the continuous-inventory system may still be adopted, for the time being, for the property whose costs can be taken from the records and for all new and renewed property as the authorizations are completed. All unrecorded property can then be gradually appraised, either as it is affected by additions and betterments or at a certain rate of so much a year.

With such records available as are provided by a

continuous inventory, it is a simple matter to furnish the information regarding physical property that is called for in many of the reports to utility and tax commissions. The New York State Tax Commission especially calls for this information in such detail that some form of inventory is becoming necessary. The desirability of such records in connection with applying for rate increases, furnishing information for security issues, determining the amount of insurance to be carried and the adjustment for fire and other losses, making sales or purchases of property, etc., is obvious when their availability, adaptability and accuracy are realized.

Aid in Calculating Operating Costs

Although a continuous inventory is efficient in itself in furnishing information for use along the foregoing lines, its greatest importance lies in its use in connection with the calculation of operating costs, as mentioned before under the second heading. It is, of course, essential in any railway property to know not only the total net income, but also the net income from the various revenue-producing divisions and departments so that any losses and inefficiencies may be ascertained and properly handled.

Take, for example, the operation of park property. This class of property is primarily operated as a traffic inducement, but is it not desirable to know definitely how much money is being made or lost in this operation, so that studies may be started to make this property in itself a better producer of net revenue as well as a traffic producer? Unless the railway official knows the value of the power station in park service, how can he ascertain the true cost of power used, which must include interest and depreciation on the property? Unless he knows the value of the park property, how can he find out its true operating costs, covering interest and depreciation? Without such true costs, how does he know that the park property is not losing more money than is made by the increased traffic?

Should not interdepartmental charges for power, shop repairs, etc., include interest and depreciation charges in order that the relative efficiencies of different departments may be known? Is any company sure that some of its shop work cannot be done cheaper by an outside concern, unless it includes in its costs the same charges that are included in work done outside?

Moreover, an electric railway doing an express business should know definitely how much this department of the business nets, and whether or not it might be better to devote the facilities and power used for express service entirely to the conduct of passenger business. To know this it is necessary that the entire value of property used exclusively and in part for the express business be ascertained, and that all proper interdepartmental charges be set against this business.

Furthermore, in calculating the cost of rush-hour service, it is essential that the property necessary for this service, over and above that necessary for regular service, be known definitely in order that accurate costs may be secured. From many present-day records this splitting up of property values is a difficult task and will probably, at least in part, be an estimate.

Showing Depreciated Values

The continuous-inventory system outlined by the 1916 engineering-accounting committee provides for the showing of depreciated values on all property. To do this it is necessary that the rates on all different classes of property—and they vary considerably—be set up and available for ready application. There has been some objection to the practice of carrying depreciated values in the inventory, but there are many reasons that make it desirable.

No insurance company, for instance, will cover more than the present value of property, but to know that all property is properly covered by insurance it is necessary for the railway to have first-hand information regarding such value.

Moreover, in checking tax assessments and appearing before municipal and town authorities for adjustment of assessments, companies will find that depreciated values are essential to substantiate any contentions. The New York State Tax Commission requires that such values for all physical property be shown in detail in reports to it.

With the age, depreciation and present value given for all property units as listed in the inventory, valuable information is also at hand for determining the proper sums to be set aside to cover depreciation and for disclosing where replacements are urgent or likely to be necessary in the near future. With such information it becomes possible to forecast accurately what the maintenance costs should be for succeeding years. By calculating the weighted age of property units, it is possible to interpret the maintenance accounts with greater accuracy. Detailed units costs on both construction and maintenance work can be calculated and compared, thereby giving more information for checking efficiency.

Separate Department Is Needed

The work of maintaining an inventory is more an engineering than an accounting matter. There are no involved accounting problems in maintaining an inventory ledger, but egineering knowledge or familiarity with the physical property is essential to maintain the unit values on the ledger. As the work is joint to a certain degree, however, better results would in all probability be achieved by not allying it with either the engineering or the accounting department. Since the co-operation of all departments is absolutely necessary for the proper handling of the work, it seems most desirable to establish a separate inventory department and to put the other departments all on a par in their relations to it. The man in charge of the inventory work should have a certain practical knowledge of engineering and accounting and at the same time be more or less familiar with the physical characteristics of railway property.

Efficiency is not gaged by the amount of money expended but by the results achieved from such expenditure. I believe that the institution of a continuous-inventory system on any property would result in beneficial achievements along the lines pointed out to such an extent that it would be pronounced a long step in increased efficiency.

If the transfers printed by the United Railways of St. Louis, St. Louis, Mo., and given to the public were placed end to end in one year, according to the *United Railways Bulletin*, they would reach around the world and would then lap over from St. Louis to New York. These transfers, a fraction more than 6 in. in length, would stretch a distance of approximately 25,000 miles. The company prints and gives to the traveling public an average of about 22,000,000 transfers each month in the year. The winter average is around 20,000,000 monthly, while in the summer the number runs up to 25,000,000 for some months, August being the largest. About fourteen carloads, or 700,000 lb. of paper, are used annually in printing the transfers, in the company's own finely equipped shop, under the direction of J. Guy Robertson, superintendent.

MID-YEAR MEETING
BOSTON
FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING
BOSTON
FEBRUARY 16, 1917

In Preparation for Inauguration of Joint Company Section of Four National Societies Toledo Company Outlines Organization as Charted Below—New Publication for Public Service Announced at Newark Meeting—Other Sections Active Also

Manila Section Elects Officers

At the twenty-third monthly meeting of joint company section No. 5 held on Dec. 5, in Manila, the results of the annual election were as follows: President, F. P. Santiago, assistant claim agent; vice-president, J. W. Earle, assistant to auditor; secretary, M. E. Chavez, chief clerk commercial department; treasurer, W. A. Seten, sales agent; director for four-year term, C. Keesee, superintendent of transportation.

In addition to the election three applicants from the transportation department were elected to membership and the president announced that at the January meeting medals would be awarded for the best three papers presented during the year 1916. The transportation department orchestra furnished music during the evening and a game of volley ball was played between an all-Filipino team from the electric department and an all-American team from all departments. The American team won by a narrow margin.

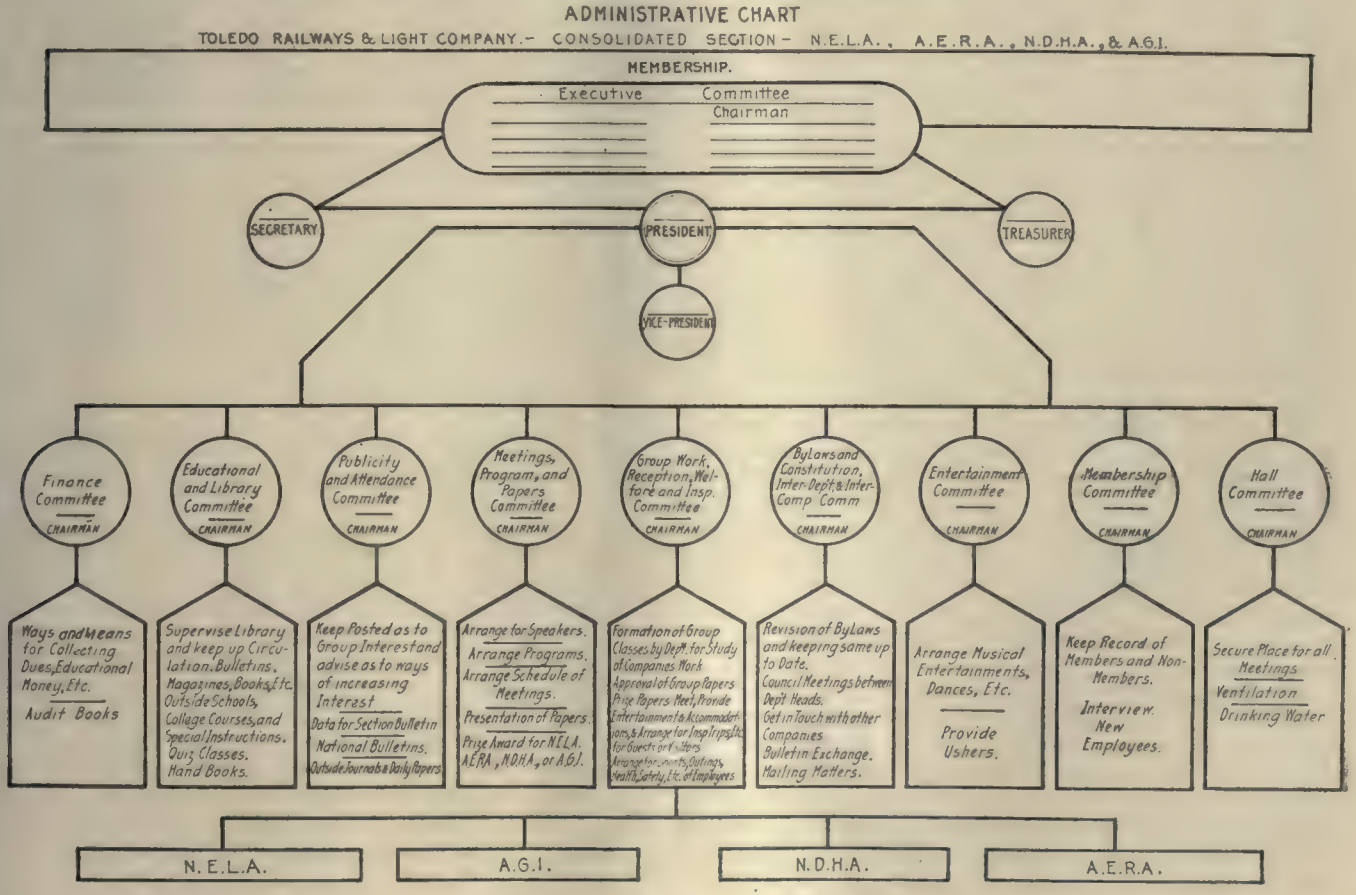
Toledo Section Organizing

Henry Friede, secretary of the joint company section which is being formed on the property of the Toledo Railways & Light Company, Toledo, Ohio, reports that the organization will be perfected at a mass meeting to be held next Tuesday in the Newsboys' Auditorium in that city. The section will be devoted jointly to the interests of the American Electric Railway Association, the National Electric Light Association, the American Gas Institute and the National District Heating Association. The tentative organization plan which has been worked out is shown in the accompanying diagram.

The program for the opening meeting comprises addresses by G. B. Muldaur, field secretary N. E. L. A., and Martin Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J., chairman of the American Association committee on company sections and individual membership. A new musical organization, composed exclusively of company employees and appropriately named "The Rail-Light Band" will make its first public appearance.

The spirit in which the new work is being undertaken is indicated by the following quotations from Mr. Friede's report:

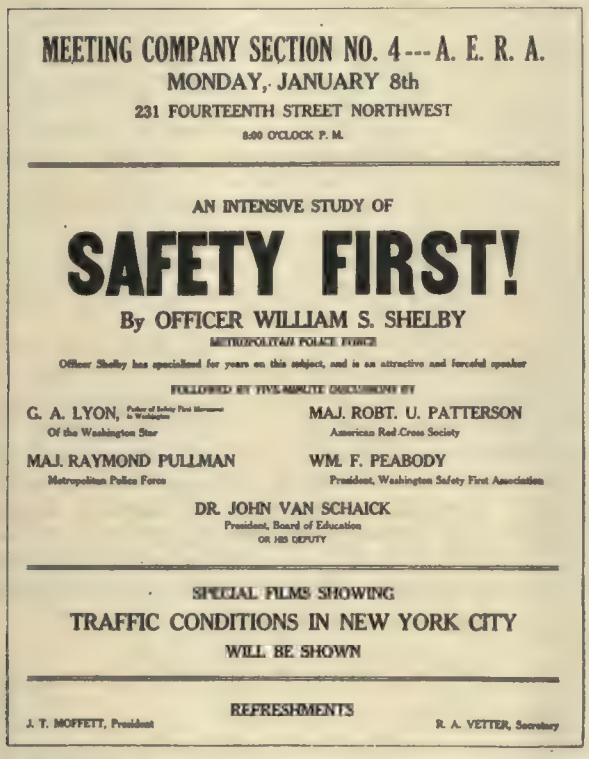
"In this undertaking we shall succeed because we are pinning our fate to a very good slogan which has been in use by a small mid-western city for some time, namely 'The dern fool didn't know it couldn't be done, so he went ahead and did it.' There are several very good reasons why we are trying to consolidate the work, the most important being that we have a property which provides railway, gas, heating and electric service to a large and ever-growing community. We believe that any educational movement, such as the one under-



taken, should cover as far as possible the entire property and we shall not stop until success in great measure has crowned our efforts.

"Beyond all doubt one of the greatest benefits possible for the future is that which will come through a proper understanding of the company's general affairs by its employees. We firmly believe that the improved departmental relationship and the better individual feeling we have always hoped to obtain will come largely through a progressive and enthusiastic educational movement. We are all very enthusiastic about the proposed plan and believe that it will lead us into brighter and better paths for the future."

Washington Ry. & Elec. Co. Section


MEETING COMPANY SECTION NO. 4---A. E. R. A.
MONDAY, JANUARY 8th
231 FOURTEENTH STREET NORTHWEST
8:00 O'CLOCK P. M.

AN INTENSIVE STUDY OF
SAFETY FIRST!
By OFFICER WILLIAM S. SHELBY
METROPOLITAN POLICE FORCE
Officer Shelby has specialized for years on this subject, and is an attractive and forceful speaker

FOLLOWED BY FIVE-MINUTE DISCUSSIONS BY
G. A. LYON, Of the Washington Star
MAJ. ROBT. U. PATTERSON, American Red Cross Society
MAJ. RAYMOND PULLMAN, Metropolitan Police Force
WM. F. PEABODY, President, Washington Safety First Association
DR. JOHN VAN SCHAICK, President, Board of Education OR HIS DEPUTY

SPECIAL FILMS SHOWING
TRAFFIC CONDITIONS IN NEW YORK CITY
WILL BE SHOWN

REFRESHMENTS
J. T. MOFFETT, President R. A. VETTER, Secretary

The reproduction of a large poster used in advertising the January meeting of Company Section No. 4 gives the story of the meeting in a nutshell.

Public Service Section

At the meeting of Company Section No. 2, held in Newark, N. J., on Jan. 18, the principal speaker was Percy Ingalls, secretary Public Service Railway. He gave "A Few Impressions of England in War Time." J. L. O'Toole, publicity agent, made the announcement that the first issue of *The Trolley Wheel*, the employees' magazine of the company, was on the press and would be out within a few days. Its purpose is to furnish a medium of communication among the men and to constitute a popular history of the development of the property. Secretary F. J. Davis reported the receipt of eight applications for membership, and Chairman A. T. Warner stated that this brings the membership to 453.

Mr. Ingalls' talk was based upon a trip which H. C. Donecker and he had made to England last summer. His description of the Zeppelin raids, the training camps, the precautions for safeguarding the country, the substitution of women workers for men, etc., gave his hearers a vivid picture of conditions in a country at war. The visitors saw much of Sir Albert Stanley, a former official of the company, and one of the most interesting parts of Mr. Ingalls' remarks was that in which he paid a tribute to this railway man who now plays such an important part in England's share of the war.

F. W. Doolittle Speaks in Milwaukee

At the meeting of company section No. 1 held on Jan. 11 in Milwaukee, F. W. Doolittle, formerly head of the bureau of fare research of the American Association, read a paper on "Some Phases of Our Fare Case." He gave a digest of the several fare cases in which the company had been involved and also analyzed the elements of the present case. He took up among other topics the eight-hour question and the increases in the costs of commodities contributing to the present high cost of living.

Mr. Doolittle was followed by A. D. Schwenke of the accounting department who explained the work done by that department and showed how this work is facilitated by the use of the latest labor-saving devices. He used lantern slides to explain the workings of the several devices and statistics to demonstrate the savings which have been secured. A lively discussion followed the presentation of this paper, covering the topics brought up by both speakers.

Other features of the program were several piano duets by W. C. Bolt and W. W. Cook, active members of the section, and the distribution of the regular "Review of the Technical Press." Sixty-five members attended the meeting.

Cost of Bus Operation Soars

Increased costs for motor bus operation due to the European war average considerably more than 100 per cent, according to a report sent out by the Fifth Avenue Coach Company, operating principally on Fifth Avenue, New York, on a 10-cent fare. The company says:

"When one considers that in some cases the increase in price amounts to more than 300 per cent and many times to more than 200 per cent it is not to be wondered that a quietus has been placed on jitney buses and that public transportation lines throughout the country are feeling the high cost of living.

"Some of the most noticeable increases in the cost of raw materials are in the electrolyte used in the lighting batteries, which has risen 388 per cent; aluminum, which has risen 248 per cent, and sheet brass, 188 per cent. Gasoline, which is consumed by the buses by the carload, has doubled in price. Strangely enough, green paint, which is the official dress of the big double-deck buses so familiar to New Yorkers, has had the smallest proportional advance of all the materials necessary to bus operation—only 9 per cent."

Buenos Aires and Tigre Connected by Electric Lines

Tigre, a popular pleasure resort 27 miles from Buenos Aires, was recently linked more closely with this city by the electrification of a suburban railroad. The road belongs to the Central Argentine system. The main power plant, located near Tigre, generates current at 20,000 volts, which is distributed through underground cables to substations which supply the trains by means of a third-rail. The coaches are connected in units of two, consisting of a motor car and a trailer. Two units make up the standard train, although more may be used. The steam railways have been running from thirty to fifty trains daily between these two cities according to the *Bulletin* of the Pan-American Union.

COMMUNICATIONS

Tributes to the Memory of Henry Gordon Stott

INTERBOROUGH RAPID TRANSIT COMPANY
NEW YORK CITY, Jan. 16, 1917.

To the Editors:

It has pained me extremely to learn of the death of Mr. Stott. In his death the company has lost an invaluable officer, in whose judgment and integrity it had the greatest confidence. His pre-eminent ability was universally recognized. His personal character was such as to endear him to all who knew him.

THEODORE P. SHONTS.

NEW YORK CITY, Jan. 18, 1917.

To the Editors:

The death of Henry Gordon Stott is a great personal loss to hosts of friends and acquaintances who had been drawn to him and who esteemed him most highly. He had all that was necessary to inspire admiration, command respect, and win friendship in the wide circles of professional, business and social life in which he mingled. A sterling character, a well-trained and balanced mind, evincing marked strength, originality and individuality, animated by the spirit of progress and of growth, controlled by a judicial temperament, sweetened by great kindness of heart and amiability of disposition, sustained by the desire to give help, do a favor, or cause pleasure to all with whom he came in contact—these were some, though not by any means all, of the prominent traits and characteristics of the man whose loss is mourned.

Beyond this zone, composed of those with whom Mr. Stott came in personal contact, there is a still greater zone, reaching out to great distances in the widest circles of professional work, in which the death of Mr. Stott will also be felt and regretted. The same qualities of mind which had endeared him to his friends and commanded their admiration, availed him in the important part which he played in the evolution and development of the art of generating electric power on a large scale in central stations. His career as an engineer showed that he possessed quite remarkable powers of adaptability and assimilation. It is most interesting to note that while his early technical training was specially directed to and his experience was obtained in the particular field of electrical engineering in which electrical energy is generated and handled in most minute quantities and by the most delicate methods, namely, the field of ocean-telegraphy, he found his way, by successive stages, into the field where electrical energy is generated and handled on the largest possible scale. In this larger field he witnessed a rapid growth from methods of electric power generation of relative crudity and woeful disregard of economy, to methods of the most scientific character, designed, operated and controlled with the most minute care and the highest scientific precision. It is precisely here that his early education and especially his high respect for methods of accurate measurement proved most useful elements of his professional success. He had so well learned to understand and to appreciate the importance of economy when dealing with the receiving and distributing end of electric power circuits in which the greatest care was taken to save fractions of a per cent of energy by eliminating or reducing losses, that he appreciated and realized, perhaps better than any other power station engineer, the benefits which might be derived from the application of similar methods of careful, painstaking precision at the very point where by far the greatest loss occurs, namely, in the boiler room.

The electric railway industry will owe him a debt of gratitude for having emphasized so often and so strongly as he did the importance of boiler room economy. The important contributions of Mr. Stott to the development and improvement of distribution systems, especially in connection with the use of high-tension currents in cables, are overshadowed by his important contributions to the problem of cheapening electric power. The importance of low cost of power generation and distribution in the electric railway industry brought the work of Mr. Stott into well-deserved prominence, which was all the greater because the electric traction system of whose power supply he had charge was the largest in the world. It may be said that he was, perhaps, the greatest contributor of his time to the important science of central station economics. This was realized by many of his colleagues while Mr. Stott lived. Some of us did not hesitate to give him credit for his valuable efforts in this field. I am very glad to realize, at this time, that Mr. Stott's work received at least a certain amount of appreciation during his life. I find great satisfaction in being able to quote, from the Transactions of the American Institute of Electrical Engineers, the following extracts from remarks made by myself, with reference to some of Mr. Stott's epoch-making papers:

"I think it is safe to say that if it were not for the fact that electrical engineering as an art has made so much progress there would be as much blundering and empirical work in the use of coal and in the generation of power generally as there was in the good old days of the so-called age of steam, fifty years ago, which preceded the electrical age, or before electricity or electrical engineering came on the scene. It was the electrical engineer who first learned to measure power systematically and correctly. It was he who first made general use of instruments of precision inside a power station, and, after he had made a great success with his methods of precision-measurement in his own department, in the dynamo room, he found it desirable to go into the boiler room and repeat the same success there, in doing away with the old, crude, rule-of-thumb methods. Mr. Stott himself was one of the first men who preached that doctrine after having practised it himself with very gratifying results; and the men who are following his example are precisely the ones who are in the front rank as experts in power station management and economy."

* * * * * * * * *

"I consider that the Institute is to be congratulated again in having a paper of this kind from Mr. Stott. It is especially to be congratulated upon the fact that all of Mr. Stott's papers on central station economies have been read before the Institute. You do not appreciate that now so much as you will a few years from now, when you look back and see the evolution of central station economics and come to realize that Mr. Stott is the man who really put the matter on a sound basis. Some of his papers will then be recognized as classics, and we will appreciate their value. A few years hence engineers will look upon Mr. Stott's papers with the same high respect that is shown the classic writings of Rankine."

I dare say that if Rankine himself were alive to-day he would be the first to indorse this tribute of praise to a great American Scotchman, just as he would be overwhelmed by the marvellous improvement in boiler room efficiency which has been attained since his day.

Every central station engineer who had heard of

Mr. Stott, and of his magnificent work in the development of central station economy, will feel as do his friends and admirers, that the world has sustained a great loss, and that it is a great pity that he could not have been spared to continue the series of brilliant investigations and the development of the new ideas in central station design and operation to which he had devoted so much thought and study in recent years.

C. O. MAILLOUX.

UNIVERSITY OF ILLINOIS COLLEGE OF ENGINEERING
URBANA, ILL., Jan. 17, 1917.

To the Editors:

Henry G. Stott was best known to mechanical engineers for his work in power plant design and operation. His perfect familiarity with the details of his problem as an operating engineer and his ability to see with a prophet's vision the tendencies of present-day practice gave potency to his statements concerning the power plant. For example, it was his belief that we have not yet supplied the fire room with all of the facilities or with the degree of attention that it should have. Not long ago, in discussing power plant economies, he predicted that the time would come when owners of power plants would be willing to pay more to the man who operates the boiler room than to the man who operates the engine room or the turbine room because of the greater opportunity of the man in the boiler room to effect economies in operating.

While his immediate interest was in the operating of plants, he was never content to follow, without questioning, the easy road of established practice. His opinions were formulated judgments, not intuitive decrees.

I first came to know Mr. Stott intimately many years ago when we were fellow members of an advisory board of the United States Geological Survey on fuels and structural materials. At about the same time we became associated in the work of the council of the American Society of Mechanical Engineers, which society he has served as manager and as vice-president, and also as chairman of a number of its committees.

Whatever the relation, it was always his custom to do his part with thoroughness. While exhibiting no personal desire to have his conclusions adopted, his statement of them invariably attracted attention and they generally prevailed. The fact that he could be depended upon to carry to a successful issue anything that was assigned to him, doubtless has on many occasions placed upon him more than his fair share of the common burden. His scientific methods were emphasized by the whole course of his life. He was among the first to advocate detailed specifications which should govern in the purchase of power plant fuel, and he was one of the first, if not the first, to purchase coal on a heat-unit basis for plants operating under his direction.

As chairman of the committee of the American Society of Mechanical Engineers on standard pipe flanges he devoted himself to the task of harmonizing divergent views of long standing, and so successfully did he accomplish this that the committee's studies under his direction were quickly brought to a logical conclusion. When in connection with this work his committee was publicly criticized and his own action assailed, and when the time given to public discussion had been entirely absorbed by his critics and practically none had been left for him in which to give response, he made no complaint. His interest was in the successful issue of the work and this he clearly saw was forthcoming. His confidence was in the knowledge of just action and in the ultimate judgment of his friends.

W. F. M. GOSS,
Dean of the College of Engineering.

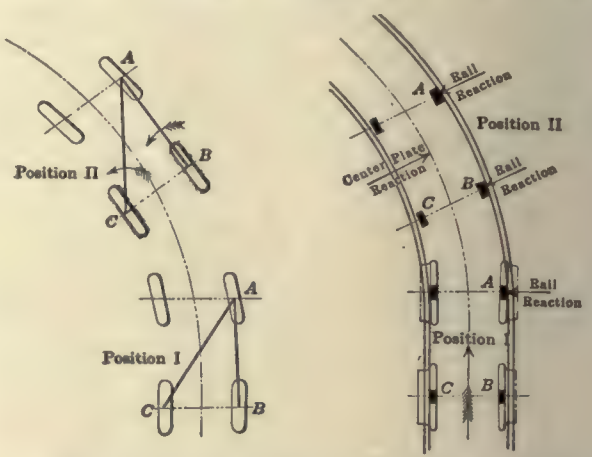
Mechanical Design of Electric Locomotives

NEW YORK CITY, Jan. 12, 1917.

To the Editors:

In connection with the discussion on the subject of mechanical design of electric locomotives appearing in recent issues of the ELECTRIC RAILWAY JOURNAL, I should like to call attention to two points that ought to be made clearer. One is that it is unnecessary to consider that a two-axle locomotive truck swings about either the inner rear wheel or the outer rear wheel when the locomotive is passing around a curve. The truck, under these circumstances, has, with reference to the locomotive frame or body, rotary motion about the truck center pin. The motion with reference to the track or ground is a compound motion of translation and rotation.

As an example demonstrating this condition may be taken the simple case of a four-wheeled automobile traveling upon a curved course on a highway. It has two motions: Translation, as from position I to position II shown in the accompanying illustration; and in addition, it has a motion of rotation, just as a locomotive truck swings on its center pin. Does point *A* swing about point *B* or about point *C*? Draw the vectors (radii) *BA*, *CA;* notice their relative directions in the two positions of the vehicle. It will be seen that, on this curve to the left, both vectors have swung to the left, or counter-clockwise, viewed in plan. Obviously point *A* swings to the left about *B*, or *C*, or in fact, about any other point back of it.



FIGS. 1 AND 2—DIAGRAMS SHOWING ACTION OF AUTOMOBILE MAKING TURN AND ENGINE TRUCK ROUNDING CURVE

The second point that I wish to bring out is that, unless a great deal of resistance to swivelling is introduced at the truck center, it is inevitable that both outside truck wheels of a two-axle locomotive truck must hug the outside rail. This fact is brought out in the second illustration. In position I the locomotive truck is shown entering a curve. Here the rail pressure at *A* tends to rotate the truck about its center pin. At position II, where the truck is entirely on the curve, the truck has rotated about its center pin with reference to the body. The result is that *B* also is brought into contact with the outer rail, which is here curved. At both *A* and *B* the rail exerts a pressure to the left, which is opposed at the truck center plate by the inertia or centrifugal force of the locomotive body acting toward the right. An automobile skids bodily sideways on a smooth greasy or icy roadway when its driver tries to make it curve, and this is what the locomotive truck is trying to do under the influence of the thrust at its center plate.

The rail at both *A* and *B* is resisting the tendency of the truck to skid toward the right, and in combination with the forward propelling force, also exerted at the center plate, is compelling the truck to proceed around the curved path.

HENRY JAMES KENNEDY, M.E.
Electric Railway, Power and Industrial Plant Engineer.

Cutting Costs in Storage Yards

NEW YORK STATE RAILWAYS
ROCHESTER, N. Y., Jan. 10, 1917.

To the Editors:

R. C. Cram, in his article on "Cutting Costs in Storage Yards" in your Dec. 23 issue, has touched upon a very important item in the operation of any electric railway and the article and photographs are worthy of considerable study.

In general there are certain features of a storage yard which it would seem could be classified, and each of which would contribute toward the cutting of costs in the operation of the road.

The first of these would be the design of the yards. This design would cover the connections with steam roads and water facilities, as well as the general track layout and plan for the location of materials, buildings, etc. When property has been purchased for this purpose, a plan should be prepared which will represent the ultimate layout and then such portions as are immediately necessary could be constructed and additions made to conform to the general plan as conditions require. The general design should also take into consideration the type of equipment which is to be used.

This brings us to the second item in cutting costs, which is referred particularly to in Mr. Cram's article, that of equipment. It is a generally admitted fact that human horsepower at any reasonable rate of pay is the most expensive kind of power purchased. Mr. Cram's article refers more particularly to the use of derricks, cranes, etc., than to any other type of equipment, although there are other things which could be worked to advantage. For instance, it might be advisable under certain conditions to use a trestle track with bins for the storage and handling of such materials as crushed stone, gravel, sand, coal, etc. Another scheme for the handling of such material, which has been in use on this property, is a temporary track, the stone or coal being unloaded in the track and on either side, the track then being jacked up on top of this material. As succeeding cars are unloaded the track becomes in effect a trestle track so that by using the bottom dump cars it is possible to unload them from a track of this sort with comparatively little labor, most of the stone going out and rolling down the embankment. This scheme has resulted in dividing by two the cost of unloading crushed stone and coal. There are also other types of equipment which can be used such, for example, as roller conveyors. The use of these is especially advantageous where material has to be piled at some distance from the track.

The third item of saving in a storage yard touched on in Mr. Cram's article is the storage of material which can be purchased at favorable times, although there is considerable danger in this on account of the liability of over-stocking. Another saving which is obtained from maintaining the supply of material is the elimination of possible delays to construction work due to the lack of material.

The fourth item and one which is very important is the organization for the handling of materials in the yard. The centralization of material receipts and disbursements obtained by means of the yard makes possible the maintenance of a permanent organization for this type of work.

There are also a great number of small ways in which a storage yard can be made useful. For instance, we have on this property a pile of materials, especially old special work, which we call our "scrap stock." Switches, mates, frogs, etc., which are removed from the track on account of changes in layouts and which are not entirely worn out are put upon this pile. Lists and records are kept in the office so that in case, at any future time, an opportunity arises where it is possible to use this material it can, by means of the office records, be located for use again. A saving of this sort would not be possible unless storage yards having sufficient capacity for this purpose were provided.

In general Mr. Cram's article touches upon one phase only of a very fruitful source of saving; that is, the saving which can be effected, especially in way departments, by the use of labor saving devices.

D. P. FALCONER,
Engineer Maintenance of Way.

Advertising in Company Publications

THE KANSAS CITY RAILWAYS COMPANY.
KANSAS CITY, MO., Jan. 16, 1917.

To the Editors:

Referring to your request that I submit my ideas concerning the question of advertising in company publications, I hand you the following:

The publication which this company established, known as *The Railwayan*, was primarily for the benefit of our employees and was intended to be a medium through which the employees could interchange ideas and thereby create a closer feeling of relationship between the employees themselves as well as between the employee and the company. The company wished to furnish this publication free to the employees and at its own expense, and I feel that any attempt to advertise in the publication would not only detract from its present standing among the employees but would also have a tendency to place the same upon a monetary basis, the exact position which we are seeking to avoid. As soon as this publication was first issued there were a number of inquiries made from prospective advertisers seeking to secure space, but we have refused absolutely to consider the same. There is no doubt but that the company could, by accepting such advertising, pay the cost of maintaining our publication, which runs into a considerable amount of money.

I cannot but feel that the insertion of advertising in such a publication would destroy its personality and also lessen the interest of the employee in the same.

PHILIP J. KEALY, President.

"Special Work"

BROOKLYN RAPID TRANSIT SYSTEM
BROOKLYN, N. Y., Jan. 17, 1917.

To the Editors:

The term "special work" is used freely by way engineers and others, and yet if even a specialist is asked to define what he means by the term he will probably be at loss to do so. It is particularly important for purpose of classification of accounts to know just what is meant by special work so that the parts of a track system may be suitably divided. As a contribution to this subject, and in the hope of bringing out further suggestions, I offer the following as a possible definition:

"Special work is that part of the track structure which is required for changing the direction of rolling

stock or for carrying it over an intersecting track structure lying within the same plane. Plain curves without guard rails are excepted from this definition."

Under the first part of the above definition would be included plain and reversed curves, turnouts and crossovers, branch-offs and connecting curves. Under the latter part would be included crossings of every description, straight and curved, right angles and acute.

M. BERNARD,
Assistant Engineer Way and Structure Department.

The Industrial Survey in Routing Studies

Information Regarding the Natural Lines of Travel of Industrial Employees to and from Work Furnishes a Logical Basis for Routing

BION J. ARNOLD has forwarded to the Rochester, N. Y., Chamber of Commerce a supplement to the report on local traffic conditions which was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 16, 1916, page 1238. The supplement deals particularly with the results of the industrial survey made in connection with the preparation of that report, and with an analysis, by industrial and residence districts, of the results of that survey. As the industrial survey is a new factor in routing studies, a brief analysis of the supplement to the Rochester report is given below.

In the survey data were collected showing the residences and places of employment of nearly 23,000 persons, and these data were represented upon maps, of which a sample was presented in the abstract referred to. The purposes of the study were to determine the distribution of residence of persons working in the several factory districts with relation to the car lines operating near their homes, and the identification of the locality of employment of persons residing in the territory tributary to the several lines.

The territory tributary to a car line was assumed to be a strip ¼ mile wide on each side of the tracks. The territory considered did not extend into the business district, where all lines converge, but included only residence territory tributary to one or a comparatively few lines. It was found practicable to isolate for study a number of well-defined districts, each of which was considered separately in respect to the transportation facilities.

By this plan it was possible to determine the "community of interest" between sections of the city and thus to indicate the natural directions for car lines to accommodate industrial workers. This community of interest was examined from two standpoints: that of persons employed in the several industrial districts, and that of those living in the several residence districts. The general procedure can best be seen from actual quotations from the report, which are therefore appended.

SAMPLE OF INDUSTRIAL DISTRICT ANALYSIS

"St. Paul Street District.

"From this division there were 2647 destinations reported, distributed as follows:

Northwest	437	Northeast	1786
Southwest	188	Southeast	198
		Suburban	38

"All of the territory is tributary to the St. Paul Street line. As is evident from the above figures, nearly 70 per cent of the persons employed in this district reside in the northeast section of the city, a great many of them living within walking distance of their place of employment. There are, however, a large number living a considerable distance east of St. Paul Street, who probably would be patrons of the car lines, particularly during bad weather, if any direct means of travel between their residence and place of employment was available. But at present in order to reach any of the other northeast lines it is necessary to make a considerable detour going south on St. Paul as far as Central Avenue and there transferring back to a northbound car of another route, which in many cases takes as much time as walking by a more direct route. In a similar manner, practically all of the residents of the northwest section working in this district have no adequate transportation facilities. A crosstown line on Clifford Avenue and Emerson Street would not only be a great convenience to these people, but would probably be a source of increased revenue to the railway company.

"There is no particular community of interest with any other part of the city, South Avenue probably serving as many people as any other line outside of the northeast section."

SAMPLE OF INDUSTRIAL DISTRICT ANALYSIS

"Monroe Avenue.

"In the territory selected along this line, 1430 destinations were reported distributed as follows:

Northwest	379	Northeast	325
Southwest	126	Southeast	600

"Aside from persons working in the industrial establishments near Monroe Avenue, there appear to be relatively few industrial employees in that section considering the very heavy traffic carried on the line. A large proportion of the destinations reported were from office buildings and stores along Main Street. Aside from Main Street, State Street, from Lyell to Court, and Clinton Avenue, from Court to Andrew, show the greatest common interest, there being 330 destinations reported from the former and 400 from the latter. In the case of Clinton Avenue, probably a considerable proportion of the destinations reported represent people who walk to and from their work, especially during good weather.

"It is probable, however, that a very large part of the traffic on this line is not to and from industrial plants, which conclusion is further borne out by the fact that the peak load traffic is smaller compared with the non-rush hour traffic than on any other line on the system. For this reason the industrial survey results should not be given too much weight in considering the proper routing for the Monroe Avenue line."

New Safety Association

Twenty-two national societies have united in the forming of the Joseph A. Holmes Safety Association to commemorate and continue the notable safety work of the late director of the United States Bureau of Mines. The function of the association is to further the safety movement by awarding certain medals and honorariums to persons active in developing devices to reduce accidents in the mineral industries, and medals to persons performing notable service in life saving in these industries.

"It Is Safe!"

The Columbus Railroad Company, Columbus, Ga., has placed small frames of picture molding in each of its cars in which "safety signs" are run in series. During December and January the style of these signs has been changed from the old form of "Danger" signs to a "Safe" sign. For instance, instead of "It is dangerous to board a moving car," the sign reads: "It is safe to board a still car," Or instead of "Wait until the car stops," "It is safe to get off a standing car."

New and Up-to-Date Articles on

EQUIPMENT AND ITS MAINTENANCE

First of a Series of Charts Gives Unusually Complete Cost Data on Overhead Construction—Spanish Railway Engineer Describes Devices for Locating Trolley Wire and Hangers—Other Articles Cover a Special Pavement-Cutting Machine, Small Gasoline Motor-Driven Interurban Car, Etc.

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Cutting Long Strips of Pavement

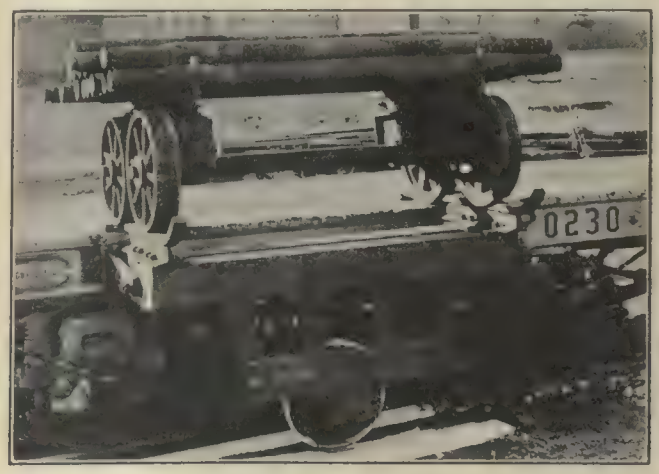
An Inexpensive Machine Made for a Special Job Operates at Low Labor Cost

BY M. E. STARK
Superintendent of Tracks, Connecticut Company, Bridgeport, Conn.

In making repairs on a section of the company's tracks on Fairfield Avenue, Bridgeport, Conn., it was necessary to remove a strip of warrenite pavement, 16,000 ft. long and 2 ft. wide, extending along the outside rails of the double track. To cut away this strip and leave the edge in an unbroken straight line looked like a big proposition, but it was decided that a machine could be built for about $125 which would do the work required. The machine as built is described below.

It consists of a cutting wheel about 20 in. in diameter, formed similar to the wheel of a glass cutter. This is supported on a heavy iron frame which, when in use, is attached to the side of a single-truck trail car by a hinge mechanism to allow for the inequality of the surface of the pavement. This machine can be attached to a car in less than ten minutes and can be detached in about the same time.





MACHINE USED FOR CUTTING PAVING IN BRIDGEPORT, CONN.

In order to get the necessary weight over the cutting wheel to force it through the pavement, a track is laid across the top of the car, upon which a small truck capable of carrying about 2 tons weight of old car axles is placed. When the cutter is in place ready for work this truck is run out on the top of the frame of the cutter, which also has a track for this truck. The car is then pulled and pushed up and down the street a few trips, and the trick of cutting the warrenite is done. Its removal is a very simple matter. A motorman with the crane car and three or four laborers will take this outfit to the scene of action after the last car is off for the night, and will set it up and cut a strip 3000 or 4000 ft. long before the first car starts out in the morning. A gang of twenty-five men working ten hours with picks and chisels could not do half as much, nor do it half as well.

Locating Trolley Wires and Hangers

The Author Describes His "Trolley Square" and Gives Suggestions on the Above Subject

BY R. FINGADO
Seira (Huesca), Spain

As wire and trolley wheel renewals are important items for consideration by electric railway companies, and as the wear and tear on both depend largely on the relative positions of wire and track, it is important that trolley wire be suspended correctly, and its proper alignment maintained. Correct wire location produces minimum tendency for trolley wheels to leave the wire, thereby obviating much trouble and expense.

THE "TROLLEY SQUARE"

The writer has recently devised what he calls a "trolley square," the use of which enables a lineman to locate the trolley wire correctly for all conditions. As shown in Fig. 1, it consists of a frame similar to a track gage, mounting two mirrors, one stationary, the other movable along a guide. Each is inclined exactly 45 deg. and is provided with a conspicuous horizontal center line. Under the movable mirror guide are two scales, one reading the distance from the center in inches, the other being graduated to read the radius of track curvature in feet.

The fundamental principle of the trolley square is shown in Fig. 2. On account of the angular positions of the two mirrors the observer virtually looks upward in a direction exactly perpendicular to the plane of the

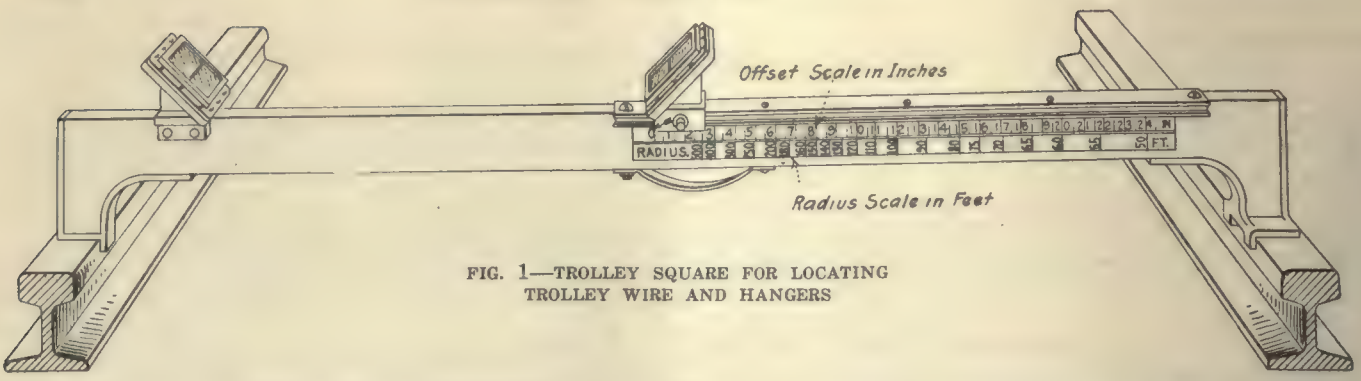


FIG. 1—TROLLEY SQUARE FOR LOCATING TROLLEY WIRE AND HANGERS

rails, at a point determined by the position of the movable mirror. Obviously, then, when the image of any object, such as the trolley wire or a hanger, coincides with the lines on the mirrors the object is in this direction from the line on the movable mirror. The appropriateness of the term "trolley square" is evident from Fig. 2.

With the movable mirror in the correct position, the lineman, by looking into the stationary mirror so the center lines coincide, should see the trolley wire reflected in the same line if it is properly placed. A man on a ladder or tower wagon needs no assistance for aligning the wire, as he can sight from above over the mirror lines and bring the trolley wire to coincide with

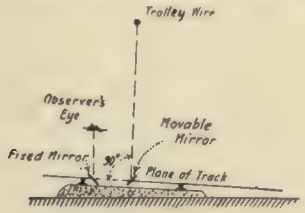


FIG. 2—DIAGRAM SHOWING PRINCIPLE OF TROLLEY-SQUARE

them. The tool weighs only about 15 lb. and is easily carried for inspection purposes by the leather strap provided. The writer has been granted letters patent on this device.

CORRECT LOCATION OF TROLLEY WIRE

Trolleys suspended with the aid of a plumb-bob will very often be found vertically over the center of the track, which is incorrect on curves and on tangents where the rails are not horizontal, as for example on streets having a curved surface. On tangents the trolley wire should be located centrally and in a line perpendicular to the plane of the track, except with pantographs or bow trolleys where the correct zig-zagging of the wire is very important. When using the trolley square on tangents the movable mirror is set over the center of the track, *i.e.*, at zero on the inch scale, but if staggering is desired it is moved along the guide the required distance and the wire is offset the same amount.

When rounding curves the trolley pole should be tangent to the curve described by the trolley wire. The correct position of this curve is not directly over the center line of the track, but depends upon the location of the trolley base on the car, and also upon the amount of elevation of the outer rail. When using the trolley square on curves or spiral track the movable mirror is set at the proper point on the radius scale.

The relation of the two scales to each other depends

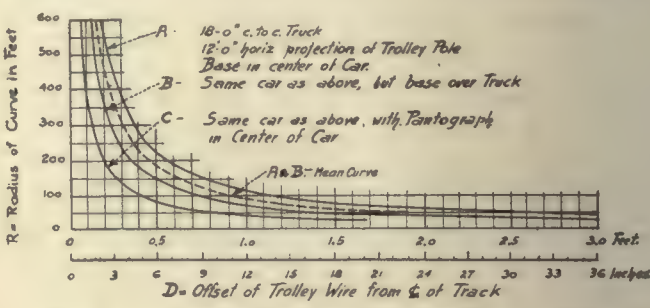


FIG. 3—SAMPLE CURVES GIVING DISTANCES TO OFFSET TROLLEY WIRE

on the type of car being operated. The distances by which the trolley wire should be offset are first found for various radii of track curvature and are then plotted, giving a curve similar to *A*, *B* or *C* in Fig. 3. In case two types of cars in about equal numbers are operated over the same track a mean curve as shown should be drawn for both. The distance *D* is that by which the wire should be offset by means of the inch-offset scale of the trolley square. With a proper curve in hand, corresponding values of *R*, the track radius, are read for several values of *D* and are then marked on the radius scale.

To determine values from which these reference curves are plotted, the trolley wire and trolley pole are projected upon the plane of the track, neglecting the

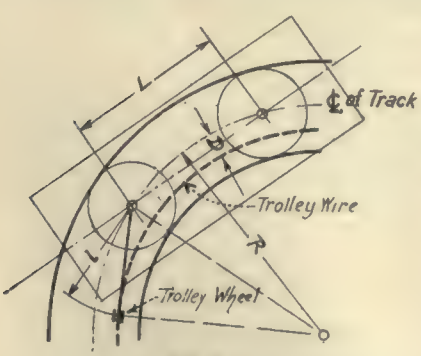


Fig. 4

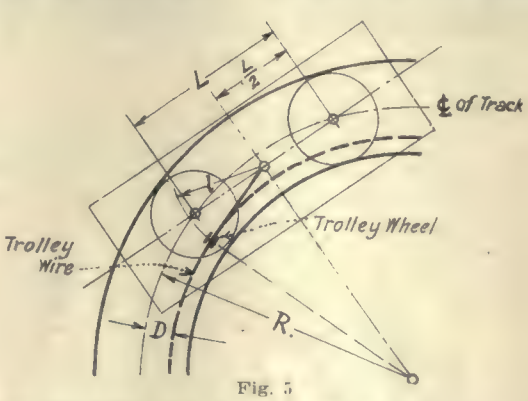


Fig. 5

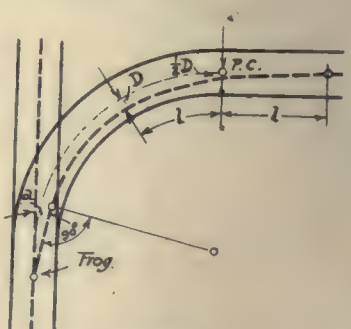


Fig. 6

DIAGRAMS SHOWING CORRECT POSITION OF TROLLEY WIRE—FIG. 4, WITH TROLLEY BASE OVER TRUCK CENTER; FIG. 5, WITH TROLLEY BASE BETWEEN TRUCK CENTERS; FIG. 6, DIAGRAM FOR USE IN LOCATING TROLLEY FROGS

offthrow due to the axle distance of the trucks. Fig. 4 shows the position of the wire for the simple case when the trolley base is over a truck center.[1] The distance L from center to center of trucks has no influence on the displacement of the trolley wire. Fig. 5 shows the position of the wire when the trolley base is midway between truck centers.[2] This calculation is also simple since L and l, the horizontal projected length of the trolley pole, are constant for a given type of car. With a pantograph l would be zero, and values of D for this case would be different.[3] If the pantograph is placed over a truck the trolley wire should follow the center line of the track. Fig. 6 shows how the wire should be hung at the entrance to a curve. The frog should be so placed that the line given by its angle a is tangent to the curve described by the wire, which is offset by the values found as explained above.

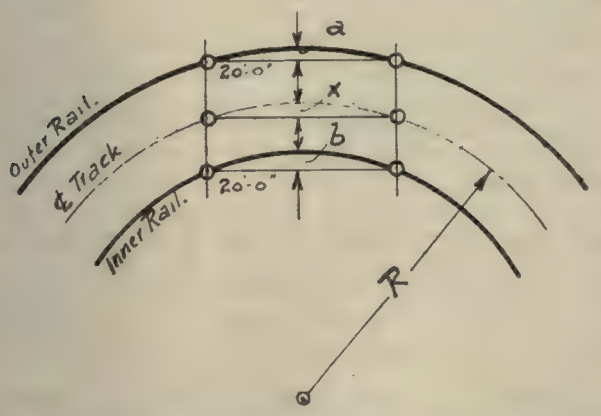


FIG. 7—DIAGRAM SHOWING HANDY METHOD FOR DETERMINING RADIUS OF TRACK

To determine R, the track radius at any point, a simple method can be used as shown in Fig. 7. The distance x between the center line of the track and the middle point of a 20-ft. chord is first found by taking the mean of similar distances as a and b determined by chords of equal length measured on the two rails. Then

$$R = \frac{50}{x} + \frac{x}{2}$$

If x is very small as compared with R, the second term in the above formula may be omitted. If it is expressed in inches, R is approximately $600/x$.

The trolley wire can be made to follow closely its theoretically correct curve by close spacing of the hangers, which is especially necessary on curves of short radius. Referring to Fig. 8, the distance d must be the same on both sides of the theoretical curve of the wire and should not exceed a predetermined maximum. Its value[4] depends on H, the hanger spacing, and upon S, the radius of the correct curve for the wire at the point where the hanger is being placed, assuming an arc of a circle between hangers.

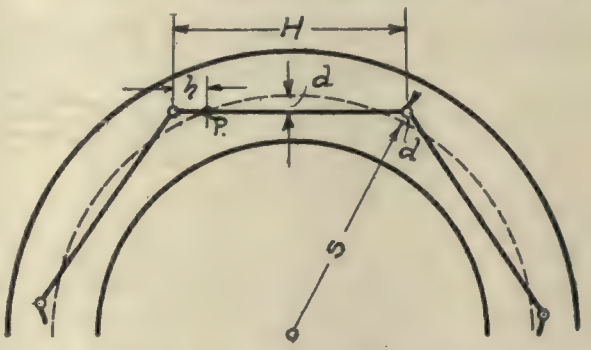


FIG. 8—DIAGRAM FOR USE IN LOCATING HANGERS

The length h from the hanger to the point P, where the trolley crosses its theoretically correct position, can be calculated[5] but it is found to have an approximate relation to the distance between hangers, *viz.*, $H = 6.9 \times h$. This relation is plotted for various

[1] $D = R - \sqrt{R^2 - l^2}$
[2] $D = R - \sqrt{R^2 - (\frac{1}{4}L^2 + l^2)}$
[3] $D = R - \sqrt{R^2 - \frac{1}{4}L^2}$
[4] $d = \frac{H^2}{16S}$
[5] $h = \sqrt{4dS} - \sqrt{2dS - d^2}$

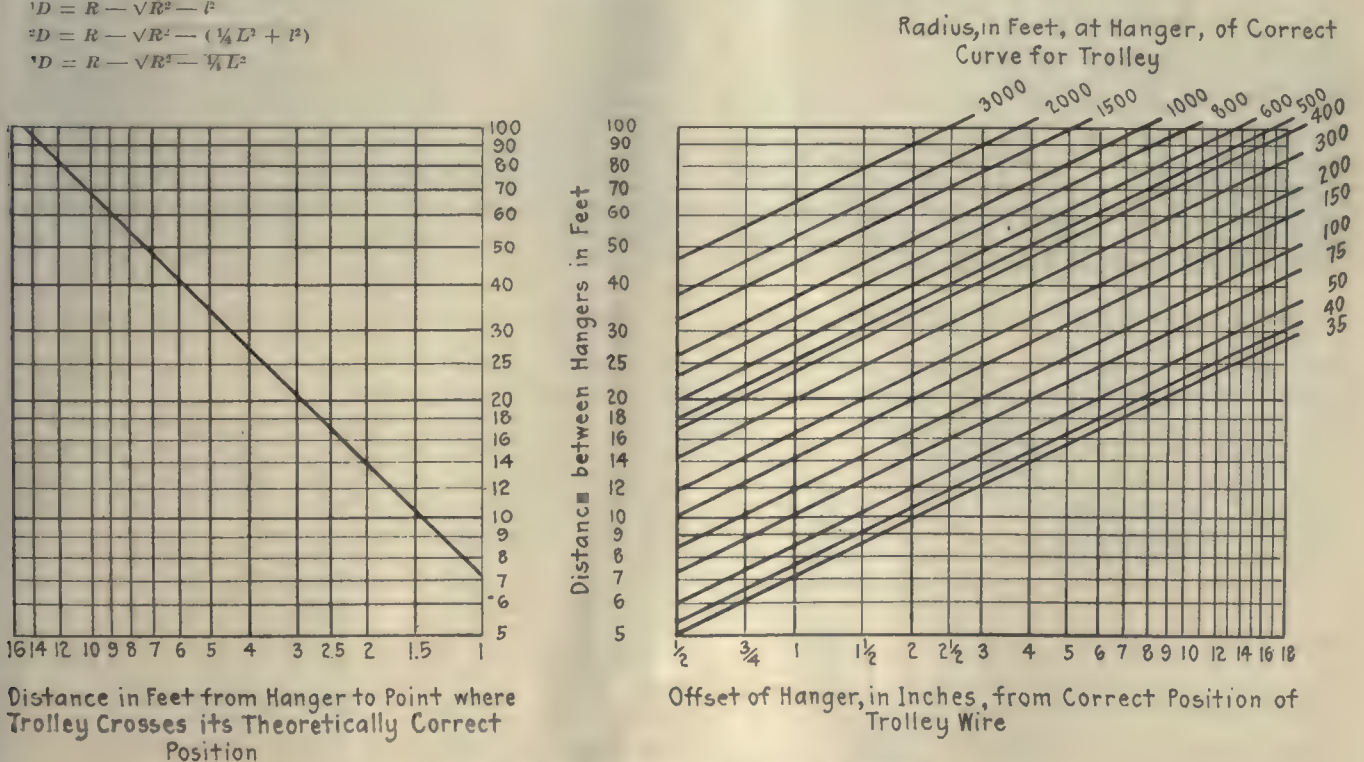


FIG. 9—CHART FOR USE IN LOCATING HANGERS

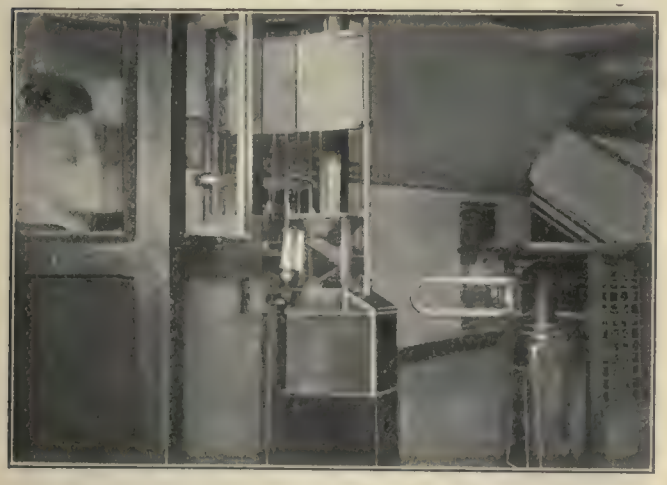
values of H on the left-hand portion of the chart shown in Fig. 9. The remainder of the chart gives values of d for different degrees of track curvature. This can be used for locating hangers in conjunction with the trolley square. The position of the trolley is first found with the latter and the distances d to offset the hangers may be read from the chart. The accuracy of the suspension may be checked by comparing the distance h with that given on the chart, the point P being determined with the trolley square.

Combining Fare Box and Turnstile Service at Boston

Plan Used on Boston Elevated Railway to Reduce Fare Collection Costs by Use of Mechanical Devices

Important economies are being secured by the Boston Elevated Railway in three trial installations of International motor-driven station registers used in conjunction with turnstiles at those subway and elevated stations where the volume of traffic is not large enough to warrant the employment of a coin inspector in addition to a change maker. About one-fourth of the stations on the Boston Elevated Railway are in this class. The other stations are already equipped with motor-driven station registers of the same manufacture, as described in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 8, 1916, page 77.

The accompanying halftone illustrates a recent installation by the company in which the functions of fare box and turnstile are combined in such a way as to eliminate the usual gateman. In the view shown, which was taken in the Boylston Street station of the



FARE BOX USED WITH TURNSTILE AND CHANGE MAKER

Washington Street tunnel, a five-arm turnstile manufactured by the H. R. Langslow Company, Rochester, N. Y., occupies the usual position opposite the change booth. In front of the latter the coin register is located, with a 10-watt reflector lamp mounted at the side so that the attendant in the booth can watch the coin cylinder rotation in connection with the unlocking of the turnstile. When the latter is locked a space of about 2 in. is left between the fare box and the end of the arm, but when the turnstile is released the space between the top shield and the fare box is about 18 in. wide.

The entire supervision of the fare box is transferred in this installation to the change maker, who also collects transfers. The passimeter records every passenger entering the station past the booth; the fare box totals the cash passengers, and the difference is the number of transfers collected. In various other installations where no turnstile is in use, passengers tendering transfers are admitted after handing them to the gateman, and no mechanical check upon the transfer is available. Two gatemen are eliminated by the combined use of the fare box and turnstile at each entrance, one man being eliminated per shift.

The coin cylinder in the fare box can be stopped by a button in the change booth if the change maker wishes to scrutinize any coin closely, and a switch is also provided for stopping and starting the motor. The automatically-locked coin box is in a cabinet at the bottom of the box. According to the volume of traffic at a station each change maker is supplied with from $50 to $100 in change each morning, the remainder being collected at night.

Car Built in Small Shop Is Driven by Automobile Motor

BY J. A. HILL
Superintendent of Equipment and Maintenance Fairburn & Atlanta Railway & Electric Company

An automobile engine furnishes power for the railway car shown in the illustration on this page. The car was built in the small machine shop of the Fairburn & Atlanta Railway & Electric Company, according to the design of the writer.

The motor, which was taken from an old Mitchell automobile, has six cylinders, 4¼ in. by 6 in. Automobile transmission gears are used, giving three forward speeds and one reverse. The car turns on Y's at each end of the line. It is mounted on a Brill 21-E truck, which was sawed in two and lengthened by inserting a section of angle iron to make the wheelbase 12 ft. long. The body is 8 ft. wide and 26 ft. long, including one 4-



INTERURBAN CAR DRIVEN BY OLD AUTOMOBILE ENGINE

ft. platform and a 7-ft. engine room. The total seating capacity is twenty-eight.

The car runs from Fairburn to College Park, a distance of 10.6 miles, making the trip in forty minutes, including the time required for ten stops. For eight round trips, about 168 miles, 18 gal. of gasoline and 2½ gal. of lubricating oil are required.

In a recent issue of the Newark, N. J., *Sunday Call* there was given an extensive and well-illustrated article on the Plank Road Shops of the Public Service Railway. The article described in detail the several departments of the shops, giving statistics as to floor area, men employed, etc. One of the illustrations was an outline bird's-eye view of the entire shop property and adjoining tracks.

Cost of Erecting Overhead Work—I

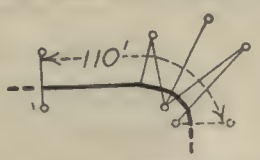
(From the records of a large Eastern company)

The following is the first group of a series of diagrams with cost figures to show actual costs of erecting the various types of overhead construction described under conditions of light, ordinary and congested traffic. Each group, as published, will be printed on only one side of a leaf so that readers may cut up the pages for their data books.

The data in each case include a simple diagram, a brief description thereof and the three sets of labor and trucking costs. It may be pointed out that the average lineman was paid $3 a day and his foreman (gangs varying from five men to six men) $4 per day. The company uses both auto trucks and horse-drawn vehicles.

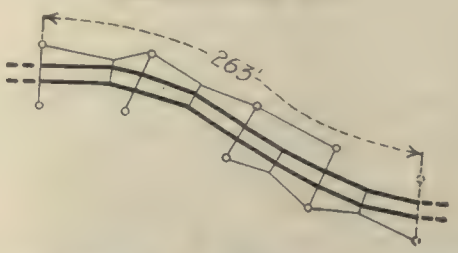
LABOR REQUIRED FOR CONSTRUCTING VARIOUS TYPES OF OVERHEAD TROLLEY SPECIAL WORK UNDER VARIOUS TRAFFIC CONDITIONS

Single track, plain curve, angle 90 deg.



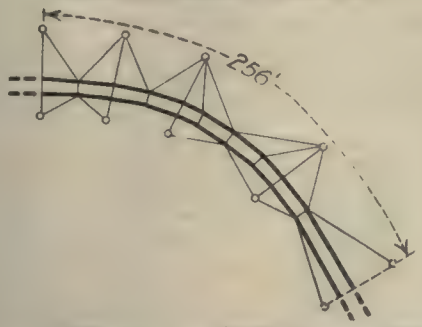
No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
1	$7.98	$3.30	$12.76	$5.28	$15.95	$6.60

Double track, reverse curve



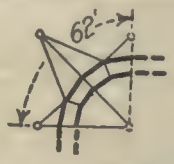
No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
2*	$14.52	$10.56	$18.15	$13.20	$21.78	$15.84

Double track, plain curve, angle 60 deg.



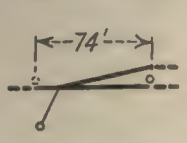
No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
3*	$18.15	$13.20	$21.78	$15.84	$25.41	$18.48

Double track, plain curve, angle 90 deg.



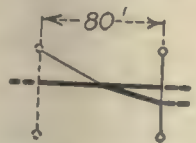
No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
4	$9.57	$3.96	$12.76	$5.28	$15.95	$6.60

Left-hand turnout



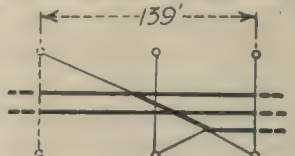
No.	Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
5	$9.57	$3.96	$12.76	$5.28	$15.95	$6.60

Right-hand turnout



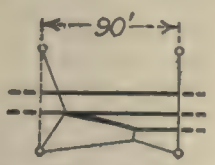
No.	Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
6	$7.98	$3.30	$11.17	$4.62	$14.36	$5.94

Right-hand turnout crossing, single track to siding



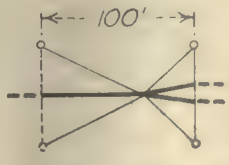
No.	Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
7*	$18.15	$13.20	$21.78	$15.84	$25.41	$18.48

Right-hand turnout to siding



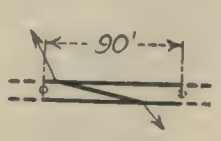
No.	Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
8	$15.95	$6.60	$19.14	$7.92	$22.33	$9.24

Diamond turnout



No.	Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
9	$7.98	$3.30	$11.17	$4.62	$14.36	$5.94

Right-hand crossover



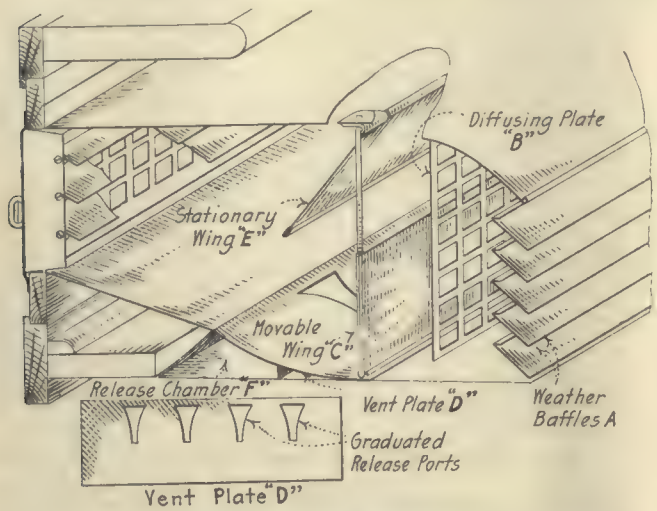
No.	Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
10	$9.57	$3.96	$12.76	$5.28	$15.95	$6.60

*Trucking includes cost of extra reel truck. The figures not starred do not include cost of superintendence and engineering.

A Natural Ventilating System Adjustable for Speed Variation

A new intake ventilator is the feature of the system of ventilation being advocated by the Railway Utility Company of Chicago. The complete system comprises a means of natural ventilation whereby the air is taken in through this new patented automatic intake in the car roof at the front end and is exhausted through Utility exhaust-type ventilators along the sides. The readers of this paper are familiar with the design and construction of the Utility exhaust-type ventilators, as they have been described and in use for about four years.

The intake ventilator is a new development in the natural ventilation field, its principal feature being a



INTAKE VENTILATOR WITH MOVABLE WING WHICH COMPENSATES FOR SPEED VARIATION

movable wing which is designed to compensate automatically for the variations in car speed and thus to permit a uniform flow of fresh air into the front end of the car. One of these devices is located at each end of the monitor deck, or in a corresponding position on an arch-roofed car, the one at the front end acting as an intake and the one at the rear end as an exhaust ventilator.

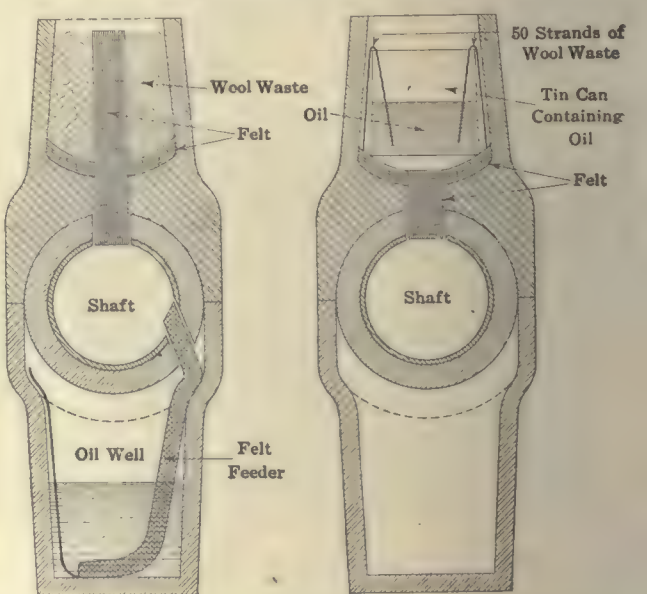
Referring to the accompanying drawing, it is seen that the air enters between a number of baffle plates, *A*, which are designed to exclude rain or snow. Just behind the baffle plates is a vertical diffusing plate, *B*, which tends to equalize the air pressure beyond it. Passing through this, the air strikes and passes over the movable wing *C*, then under the stationary wing *E* and through the grille into the car. As the car moves forward the inrush of air causes a pressure on the front of the movable wing and forces it backward, reducing the size of the opening between it and the permanent partition *E*. The position of the movable wing is thus largely dependent on the speed of the car. As it is forced backward it reduces the opening into the car to compensate for the increased pressure, and is said to admit a practically uniform quantity of air under all conditions.

Below this movable wing is a plate *D* in which are cut four vent openings. These ports in the vent plate are graduated so that the opening is increased as the movable wing is forced farther back. This releases a part of the pressure to the chamber *F* and thence to the atmosphere, tending to hold the movable wing more steady, and to prevent it from constantly moving back and forth. At a speed of about 15 m.p.h., the ventilator ceases to operate, the leakage in the car then giving sufficient ventilation. The intake is designed to admit about 15,000 cu. ft. of air per hour, while the leakage factor of approximately 25,000 cu. ft. of air per hour makes a total of 40,000 cu. ft. per hour.

In view of the fact that the Department of Health of the city of Chicago has approved this ventilating system as conforming to the requirement of the ordinance that the carbon dioxide content in a car be kept below twelve parts to 10,000 parts of air, the Chicago Surface Lines has placed orders for installing this system of ventilation on all its cars except those now equipped with mechanical systems of ventilation. About 1920 cars will be equipped each with two intake ventilators, eight exhaust-type ventilators and the thermostatic heat control. The orders include a total of 15,396 Utility Honeycomb exhaust-type ventilators, 3840 intake ventilators, 1144 round vestibule-type ventilators, and 2302 Utility thermostatic regulators for controlling the heating current.

Lubrication of Old-Type Motors Improved

The lubrication of the old-type motors of the San Antonio (Tex.) Traction Company has been improved, and the money spent for oil has been greatly reduced by a novel system developed by Henry Fink, master mechanic of the railway. The accompanying illustration shows the alterations made in the method of feeding the oil to the bearing. In the new scheme the oil is held in a tin container which fits into the stuffing box over the bearing. Strands of woolen waste feed the oil



SECTIONS SHOWING OLD AND IMPROVED METHODS OF LUBRICATING OLD-TYPE MOTOR BEARINGS

over the brim of the container and down to the felt pad, which in turn conducts the oil to the bearing. The oil-well under the bearing is not used.

After a considerable amount of experimenting it was determined that about fifty strands of woolen waste would provide the proper constant supply of oil to the bearing. This number was used, and the scheme has been in successful operation for a year. With the old system the bearings were filled with oil every night, and the lubrication cost per 1000 car-miles was about 25 cents for double-truck cars. With the improved method of lubrication the cost per 1000 car-miles has been reduced to 16 cents.

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

Cleveland Problem Acute

Congestion in Public Square Grows—Papers Protest Against Service Dominated by Idea of Preserving Three-Cent Fares

The transportation problem in Cleveland, Ohio, has become acute. It is perhaps impossible for the Cleveland Railway to operate many more cars, with the Public Square as a terminal for all lines. Moreover, the addition of cars during the rush hours would add greatly to congestion and increase appreciably the expense of operation, something which all city officials wish to escape, because it would mean an increase in the rate of fare. Apparently the city authorities feel that the elimination of congestion in the business district can be brought about only by the use of underground tracks that will emerge to the surface well out of the busy zone, and several officials have expressed themselves as favorable to this plan. Mayor Harry L. Davis, however, is opposed to placing the ownership of underground lines in the hands of a private corporation, unless the Cleveland Railway will undertake their construction on the basis of the Tayler franchise. He feels that the city should build the subways and lease them to the railway.

The renewal of the franchise of the Cleveland Rapid Transit Railway is in the hands of the City Council. This company, in order to retain its franchise, was to have spent at least $500,000 in preliminary construction work by February, 1917. This has not been done, and there is opposition among the city officials and members of the Council to making a renewal of the present rapid transit grant to the company.

In discussing accidents and delays to service, the Cleveland *Leader* on Jan. 15 said:

"The traditional 3-cent policy of running only enough cars barely to carry the traffic has been stretched to a point where a rush-hour ride in a Cleveland street car has become an ordeal of discomfort, indecency, suffocation, infection, exhaustion, and danger to life and limb. Whether all this results from failure on the part of the company, the street railway commissioner, the city administration, or the City Council, or whether it is the best that can be had for 3 cents in these times, the people have a right to know. Because they have full power to apply the remedies, they will very soon insist on being told."

In order to secure relief from the long hauls, Mayor Davis is inclined to agree with Fielder Sanders, street railway commissioner, who suggested recently that a proposition be made to the Nickel Plate Railroad to build electric railway tracks on its right-of-way for service to East Cleveland and Lakewood, either by operating the cars itself or by leasing the tracks to the Cleveland Railway. O. P. Van Sweringen, chairman of the board of directors of the Nickel Plate Railway, said a proposal would find the company in a receptive mood.

Councilman J. E. Smith has suggested that the 3-cent fare be limited to an area of 5 miles from the Public Square. This may be brought up in connection with the renewal of the franchise in East Cleveland. The 5-mile line would come close to the western boundary of Cleveland. Mr. Smith contends that the zone system is bound to come, and that it is the only thing that will save the 3-cent fare to any considerable proportion of the population.

The street railway committee of the City Council will report adversely on Councilman Kadlecek's ordinance prohibiting the interurban cars from using the tracks of the Cleveland Railway as an entrance to the city. More than fifty business men appeared at the hearing on the ordinance and entered a protest.

Emergency Petition Denied

Plea of Milwaukee Companies for Eight-Hour Day and Higher Wages, However, Will Be Considered Later on Its Merits

On Jan. 16 the Wisconsin Railroad Commission dismissed the application of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company for increased rates under the emergency clause of the public utilities act. As noted in the ELECTRIC RAILWAY JOURNAL of Jan. 13, the emergency petition had in view the securing of sufficient additional revenue to permit the establishment of an eight-hour day and the payment of increased wages to offset the higher cost of living. In denying the petition, the commission held that no such emergency existed under the public utility law as would warrant its granting the petition at this time. It was said, however, that the questions involved would be considered on their merits when hearings were held on the original petition of the companies for increased fares, this having been filed on Nov. 6, 1915. The new valuation of the companies' property, it was stated, would probably be completed by the commission in about two months, and the original petition would then be taken up. In commenting upon the action of the commission, J. D. Mortimer, president The Milwaukee Electric Railway & Light Company, stated:

"It is clear that in any subject of this magnitude, involving many complicated facts as to cost of service, time is necessary to inquire into and weigh the evidence submitted. It must be remembered in this connection that the Wisconsin Railroad Commission as now constituted is entirely different from the commission which in previous years made a very thorough study of the traction situation, and it is necessarily unfamiliar with the facts as they have been presented in earlier years. This change in personnel of the commission and its staff necessitates a much more elaborate presentation of evidence than would have been necessary if the case could have been presented as a continuation of the previous fare cases, with commissioners thoroughly familiar with every aspect of the case.

"The matter is further complicated by a revaluation of the companies' entire property, now nearing completion, the results of which the commission has expressed its desire to have in its hands prior to giving a final decision on the company's original petition, dated Nov. 6, 1915, for increased fares. While we are disappointed that no relief was granted upon the emergency as disclosed to the commission, we expect to accomplish the same result from the hearings on the merits of the original petition, to be held some time in the near future, and carry out the plans for change in hours of work and the making of allowances in compensation comparable with increases in the living cost."

New York Commission Review

The Public Service Commission for the First District of New York submitted to the Legislature on Jan. 10 its report for the year. The report blames the war and other "unforeseen difficulties" for the failure of the contractors to finish the new dual system rapid transit lines by Jan. 1, 1917, as provided in the contracts. A review of the progress under these contracts was published in the ELECTRIC RAILWAY JOURNAL for Jan. 6, page 47. Other features of the report are a review of the traffic increases in Greater New York and a summary of accidents. Concerning the street railway strike of 1916, the report says the commission has drafted a number of amendments to the public service law, which, if passed, will enable the commission to prevent a recurrence of such a situation.

Commission Discusses Railway Problems

Massachusetts Body Recommends Paving Tax Change—Will Carefully Scrutinize Further Consolidations—Says Improved Service Is Needed

In its fourth annual report to the Legislature, the Massachusetts Public Service Commission discusses the general economic problems of electric railways within its jurisdiction and renews its recommendation for legislation relieving the companies of the present commutation tax by placing all paving work squarely in the hands of municipalities, and by requiring the companies to meet only the reasonable cost of any such work done within their track locations. Referring to the recently decided Bay State Street Railway rate case, the board reviews the difficulties entailed in reaching a decision dealing with a system of this kind, which is a combination of city and rural lines operating in ninety-one municipalities and suffering from a paucity of interurban patronage. The fact that a 6-cent fare is now charged on certain portions of the system and a 5-cent fare on other portions, has caused some complications which may require adjustment at the end of the experimental period of one year. The board is of the opinion that the investigation of the company's operating methods by B. J. Arnold has had, and will continue to have, a beneficial effect on street railway operation throughout the State.

The commission believes that the terms of any further consolidations of street railways must be scrutinized with great care. In the past, the tendency has been to overestimate the virtue inherent in such consolidations and to permit them freely, provided the total outstanding capitalization remained unchanged. The result has been that prosperous companies have frequently taken over companies with low earning power on the basis of an exchange of stock share for share, when these latter properties might have been consolidated on a more favorable basis corresponding more nearly to their market value. In this way the resources of the prosperous companies have at times been spread so thin that their financial strength has been impaired. The board also holds that any further extension of the control of voluntary associations over Massachusetts public utilities should be prevented by appropriate legislation.

The commission states that there is ground for doubt, from the experience so far gained in the cases where it has been adopted, whether the introduction of the 6-cent fare unit is likely to be of great benefit to the average street railway. It is of the utmost importance that every effort should be made to invite additional traffic through faster, better or generally more attractive service and to decrease expenses through improved operating methods. In this connection, type of rolling stock is of particular importance. The economy from large semi-convertible cars or trailers, easy to load and unload, is marked, and it is now possible (under Chapter 671, Acts of 1914) to capitalize temporarily replacements involved in substituting such cars for older types, spreading the charge to operating expense over a series of years. The report states that the economy through proper attention to paint, cleanliness and general maintenance of cars is also marked. Because of the importance of this subject, the commission desires, if it can secure a slight increase in appropriation, to centralize and further develop the inspection of street railway rolling stock throughout the State, making this the special duty of one man. If this plan is carried into effect, the inspector will be expected not only to direct his attention to the cleanliness and upkeep of the cars, but also to keep himself informed as to the progress of car designing and maintenance throughout the country.

Some extension of the right of eminent domain is considered desirable for street railways. The commission believes that it is possible that if a broad power were granted by the general law, companies like the Bay State Street Railway would be able gradually to convert certain existing lines of low earning power into high-speed routes, similar to the one in very successful operation between New Bedford and Fall River.

The report states that the general condition of the street railway properties in Massachusetts continues to be unsatisfactory. The financial condition of the roads, the scarcity and high cost of labor and of material and the delays in delivery of the latter have resulted in few improvements. Recognizing the great need of the companies for capital, the commission admits that rate increases in some cases may be the lesser evil, but believes that the present regulative policy will in the long run lead to the most satisfactory results.

Electrification of West-Side Lines

Form of Agreement Between City and New York Central for West Side Improvement Made Public

A "form of agreement" reached between representatives of the city of New York and the New York Central Railroad was made public on Jan. 16. It was asserted that it disclosed that the road was willing to make what it considered important concessions for the right to carry out its west side improvement, and especially its plans in Riverside Park. The agreement, which contemplates an expenditure by the road of between $60,000,000 and $100,000,000, provides that its rails in the park be completely hidden by roof of subsoil and fill carried over the right-of-way to the waterfront. This arrangement, the road contends, will not only increase the attractiveness of the park, but actually add twenty acres to it. The draft also proposes that the city convey to the railroad properties and easement rights totaling $11,094,381 and receive in return lands owned by the road valued at $4,984,482. The difference of $6,109,899 is to be contributed by the city as its share in bringing about a development which will, it is contended, add greatly to its commercial greatness and railroad facilities.

It is provided that the railroad completely electrify its entire line in four years. All construction work south of Seventy-second Street must be completed within six years. Below the yards at Sixtieth Street it is the intention of the company to operate its trains on elevated structure to Canal Street, and to turn over its rights-of-way on Hudson Street, Eleventh Avenue, etc., below that to the city, in return for property and concessions to be received by the road from the city.

As explained by Controller Prendergast of New York City, none of these provisions can go into effect until the "form of agreement" has been submitted to the Board of Estimate and Apportionment of the city and discussed at additional public-hearings.

Anti-Strike Plan Offered

Senator Cummins Presents Bill as a Substitute for the Newlands Measure

Senator Cummins of Iowa presented to the Senate interstate commerce committee on Jan. 17 a bill designed as a remedy for the conditions that might arise in case of a long-drawn-out transportation strike, and as a substitute for the plan proposed in Senator Newlands's bill giving the President power to take over railroads temporarily in time of emergency, by the use of the military power. Under the Cummins proposal, if a road were tied up by a serious strike or similar cause, the Department of Justice would apply for the appointment of a receiver, who would then operate the road. After three months if the road was still unable to take care of itself, the Government would take over the property permanently.

The committee also discussed on Jan. 17 a bill proposed by Senator Newlands to prevent the physical obstruction of trains in strikes, and another measure suggested by Senator Cummins providing for the investigation of railroad disputes, by a committee consisting of the Vice-President and four Governors of States appointed by the President. The latter was offered as a substitute for the "Canadian disputes act," voted down on Jan. 16, which was designed to prohibit strikes and lockouts during the course of a Government investigation. No vote was taken on any of the suggestions made on Jan. 17.

Plea for Rhode Island Company

Federal Trustee Says Company Cannot Be Run Successfully Unless Relieved of Burdens

Rathbone Gardner, chairman of the trustees appointed by the United States Court to manage the Rhode Island Company, in addressing a public gathering in Providence, R. I., on Jan. 15, declared that the company could not be successfully run by trustees or anyone else, unless it be relieved of some of its burdens or allowed to increase fares. He favored the increased fare proposal. He said in part:

"The present 5-cent fare is evidently inadequate. If it was the proper thing ten years ago, everyone realizes that it is inadequate now. Everything used by a railroad has increased in cost. Wages have gone up and may go still higher. The street railway industry is the only one I know of which, with increased cost of operation, cannot increase the price of its product."

Mr. Gardner said that the company is paying to lessors of its various component lines approximately $1,153,794 as rentals each year. An expert valuation of the company is now being made. Mr. Gardner told of the various franchises and other taxes the road has to pay. In this connection he said:

"Neither the present nor any other administration can continue to run the road in Providence successfully unless relieved of some of its burdens or allowed to increase the present 5-cent fare. At present the company has no means of raising money, as an issue of stock upon a road not paying dividends would not be apt to prove an attractive investment to purchasers. Neither has the company any property upon which a substantial sum of money could be raised. Just what is to be done I do not know. We of the board of trustees have been doing the best we know how, but we are most seriously handicapped."

The company has announced that it is making a systematic study of its car schedules, with a view of making a general shift to better the service. Figures kept by the city's public service engineer show that during the rush hours fifteen minutes are consumed by some cars in making one loop of less than 2000 ft. about the center of the city.

Trial of Strike Damage Case

Verdict of $2,800 Awarded to Railway for Damages to Its Property

All efforts have been unavailing which were made by counsel representing the county of Erie to have Justice Louis W. Marcus in Supreme Court at Buffalo, N. Y., dismiss the action brought against it by the International Railway in an effort to recover $108,410 damages for property alleged to have been destroyed during the street car strike riots in the spring of 1913. Under the decision of Justice Marcus, the county of Erie can be made defendant in the damage action because of its alleged failure to provide adequate protection to the company's property and the International Railway's additional complaint that the county can be held responsible for the company's earnings during the period when service was curtailed.

Scores of witnesses were examined during the first three days of the trial, which was started on Jan. 8. The company has closed its case and Thomas A. Sullivan, former county attorney, who appears for the defense, started the examination of witnesses for the county during the early part of the week of Jan. 15. A great mass of evidence was introduced by James O. Moore, of Norton, Penney, Spring & Moore, of counsel for the International Railways, all of which tended to show that rioting prevailed in the city during the strike period. Newspapermen who gave evidence for the company told of rioters who hurled bricks and stones off the eighteen-story Marine Bank building onto passing street cars. Others told how members of the two regiments of the New York National Guard sympathized with the strikers and rioters and did damage to the company's cars while engaged in patroling the streets and apparently protecting the company's property. Michael Regan, who was chief of police during the strike, testified that the mobs were so riotous that he was unable to handle them, even with hundreds of special police and deputy sheriffs.

Employees of the International Railway testified as to the condition of cars when they left the various carhouses and of their damaged condition when the cars returned. Windows had been broken, vestibules smashed, car bodies damaged and wires cut in all parts of the city. Loyal employees who operated cars during the few days of the strike told how they were intimidated and threatened by strikers and rioters.

Rebuttal testimony was introduced by members of the Buffalo police department who told of specific damage done by strike breakers who were brought to Buffalo by the International Railway.

On Jan. 18 the company was awarded a verdict of $2,800 against Erie County for property damage during the strike.

Report on Omaha Franchise

Attorney for Railway Replies to Demand of City That Portion of System Be Abandoned

John Lee Webster, counsel for the Omaha & Council Bluffs Street Railway, Omaha, Neb., has reported to G. W. Wattles, president of the company, with respect to the claim of the city to the reversion of the property of the Omaha Horse Railway. Mr. Webster suggests several points to sustain the position of the company as adverse to the demand now made upon it, that it vacate certain streets which form the heart of its system. Mr. Webster recites the history of the franchises and the terms under which they were granted, and the fact of the consolidation of the Omaha Horse Railway and the Omaha Cable Tramway into the Omaha Street Railway under the law of 1889. He reviews the organization of the Omaha & Council Bluffs Street Railway, and its succession to the franchises and property of the Omaha Street Railway, and further cites the fact that the city not only acquiesced in the removal and extinguishment of the Omaha Horse Railway's property, but actually ordered that some of it be removed, which order was carried out at a considerable cost to the present company. In his conclusion, Mr. Webster says:

"If the city should undertake to interfere with the property or franchises of the company at the present time, when it is conceded that the company is the legal holder of the franchise granted to the Omaha Cable Tramway, which does not expire until May 22, 1928, this company should insist on the full limit of its rights under the street railway act of 1889, to wit: 'to hold said properties and franchises in perpetuity.'"

Los Angeles Subway Reagitated

Subway agitation has been renewed in Los Angeles, Cal. On Jan. 5 plans were submitted to Mayor Woodman of that city for building a subway to connect the Hill Street station of the Pacific Electric Railway with the Vineyard station, together with a proposal that the railway build a cutoff line from Vineyard station to Highland Avenue, and thence through the Cahuenga Pass to the San Fernando Valley. In discussing the matter, the Mayor said:

"One of the imperative needs of Los Angeles is relief from the congestion of traffic on its main streets. Some years ago steps were taken toward a diversion of the traffic of outside towns by a subway from Hill and Fourth Streets to Vineyard, and distributing from that point.

"For ten years there has been talk of the development of a rapid transit subway, but down to date little has been done actually to realize the project. Millions of dollars already have been expended in acquiring rights-of-way for this subway, and it would certainly seem to be expedient to awaken the project into activity at the earliest possible moment.

"I understand that legal hindrances to the construction of the proposed subway will soon be removed and necessary rights-of-way acquired. The traffic problems of the city have reached an acute stage, so that it seems unquestionably the time to press the development of this subway rapid transit service. It was thought justifiable ten years ago. If it was justifiable then it certainly is many times more so now."

A Plausible Impostor

A warning has been issued by Anton H. Classen, president, Oklahoma Railway, Oklahoma City, Okla., in regard to a man calling himself Chester Williams. This man visited the office of the Oklahoma Railway a short time ago and represented himself as an ex-convict who had reformed and desired to secure work. He had a letter that he claimed had been written by Thomas Mott Osborne, former warden of Sing Sing prison, New York. A certain part of the man's story made Mr. Classen suspicious, and he took the matter up with the Prison Association of New York. The testimony from that organization indicates that the same man, working under the name of George Colgate, had been soliciting funds in St. Paul and Minneapolis. He is said to be "one of the smoothest crooks in the business." Mr. Classen sends this word about him so that other companies may be warned.

Service Suspended in Cleburne.—The Cleburne (Tex.) Street Railway has again discontinued service, and this has led to the inauguration of a jitney line in the city. In February, 1916, service was resumed on the line after having been suspended for more than a year.

Bonus for Pacific Electric Railway Employees.—J. McMillan, general manager of the Pacific Electric Railway, Los Angeles, Cal., announced on Jan. 2 that the company would give all employees who had been in service two years and were receiving less than $2,000 a year a bonus of 10 per cent of their salaries. Half the amount will be paid in January and the remainder in July.

Newspaper Reviews Railway Work.—The *Daily Journal* of Springfield, Ill., published a column article recently giving detailed information of the interurban railways centering in that city and praising the work of the Springfield Consolidated Railway. The work of the Illinois Traction System was noted carefully. Several roads which are projected from that city also received attention.

Completing the St. Paul Electrification.—Finishing touches are being put on the last 25-mile stretch of electrified territory of the Chicago, Milwaukee & St. Paul Railroad. It is expected that the entire mountain division will be electrically operated by Feb. 1. Early in December the line from Harlowton to East Portal, 406 miles, was in operation for passenger and freight service.

Another "Conscience" Contribution—"God forgive me" was the footnote of an unsigned letter, accompanied by $50, which the Public Service Railway, Newark, N. J., received recently. Above the footnote was written, "Conscience Money—N. & S. O. Ry." The letter was mailed in Newark. It is supposed to be from a conscience-stricken conductor on the Newark and South Orange line.

Danbury Hatters' Judgment.—In a new phase of the old "Danbury hatters'" case the Supreme Court on Jan. 8 decided that Dietrich E. Loewe, Danbury, Conn., hat manufacturer, and not the United Hatters' Union, is entitled to $20,000 in interest accrued on union hatters' savings bank deposits attached toward satisfying Loewe's $353,000 judgment secured under the Sherman law for union boycotting in 1903.

Railway Men Arraigned for Failure to Heat Cars.—The seven officials of the Brooklyn (N. Y.) Rapid Transit Company who were summoned to court for failing to maintain a minimum temperature of 40 deg. Fahr. in the cars on their lines appeared before Magistrate Walsh in the Adams Street Police Court on Jan. 16. Through their attorney they waived examination and were held in $100 bail each for Special Sessions.

Refuse Officially to Call Off Strike.—Sixty members of Division 709 of the Amalgamated Association on Jan. 10 unanimously voted "to continue" the strike called on July 16 on the lines of the Harrisburg (Pa.) Railways. More than seventy-five members of the union are back at work under the new working agreement made by the company with its men, and the places of the other men were long since filled with new men.

Interurban Road Increases Wages.—The Rockford & Interurban Railway, Rockford, Ill., increased wages 1 and 2 cents an hour, effective on Jan. 1. The wage increase affects 200 men. The younger men will receive the 2-cent increase, as the older men received the larger advance last year. The present wage scale is from 21 to 28 cents an hour. The increase involves an additional expense to the company of about $10,000 a year.

Check of Minneapolis Valuations Suggested.—The economy and efficiency committee of the new City Council of Minneapolis, Minn., on Jan. 4 discussed the suggestion of Mayor Van Lear that an expert be retained to check the valuations submitted by the Twin City Rapid Transit Company and by City Engineer Cappelen in connection with the application of the Minneapolis Street Railway for a renewal of its franchise in Minneapolis.

Pittsburgh Subway Legislation Proposed.—C. K. Robinson, assistant city solicitor of Pittsburgh, Pa., is preparing for introduction into the Legislature of Pennsylvania a general measure providing for rapid transit subway construction in Pittsburgh. It is said that the basic idea of Mr. Robinson's plan is to provide for a city-built downtown subway loop or make legal the provision of funds for the construction of such a line by a private corporation.

Franchises Made Uniform in Expiration.—On Dec. 29 the street railway committee of the City Council of Cincinnati, Ohio, decided to approve an extension of ten years in the franchise of the Interurban Railway & Terminal Company. It provides for certain changes in route to conform to improvements made at the Delta Avenue crossing, but makes no reference to the rates of fare. The franchises of the company will now all expire at the same time.

Municipal Employees Seek Increase.—The trainmen in the employ of the San Francisco (Cal.) Municipal Railway have renewed their request to the Board of Works for an increase in wages of 5 cents an hour. While the last annual statement of the lines showed a profit, T. A. Cashin, superintendent, issued a note of warning against overextension. The cost of the increase now requested is placed at $72,000 for the year, and T. A. Reardon, president of the Board of Works, has intimated that the board will support Mr. Cashin in the stand that he has taken and that no unnecessary outlays will be made.

Adamson Law Argument Concluded.—Argument in the Adamson law case was concluded before the Supreme Court of the United States on Jan. 10 and that body now has before it for decision the question of whether the Adamson statute is constitutional. In their closing arguments the railroad attorneys, Walker D. Hines and John G. Johnson, maintained that there was a lack of authority by Congress to enact "railroad wage legislation." They insisted that the new law was incapable of operation with judicial interpretation. They contended, furthermore, that the act took away property without due process of law and that it interfered with liberty of contract.

Affairs of United Railways, St. Louis, Reviewed.—The St. Louis *Post-Dispatch* in its issue of Jan. 16 published a review of the affairs of the United Railways, including a summary of the history of the company's organization, both financial and legislative, presented in the light of the appeal by the company to the city for release from the so-called mill tax. Richard McCulloch, president and general manager of the company, was quoted as giving among other reasons for the problems that confront the company now the severe general panic of 1907, continuous and unprecedented increases in the prices of labor and materials, the increase in the use of the transfer and the higher standards of service required by the Public Service Commission.

Commissioner Wood to be Tried in February.—Assistant District Attorney James O'Malley of New York City applied on Jan. 4 to Judge Mulqueen, in General Sessions, to have the case of ex-Public Service Commissioner Robert Colgate Wood, under indictment on a charge of having solicited a bribe, put on the regular calendar for an early trial. Judge Mulqueen assigned the trial to the February term of Part VI, where Judge Nott will be sitting. Judge Nott last month denied a motion made by District Attorney Swann to dismiss the indictment against Mr. Wood, on the ground of insufficient evidence. In his decision, Judge Nott

said that as Mr. Wood was a public official, he should be tried on the indictment, and either be vindicated or convicted.

Franchise Referendum in Dallas.—The City Commission of Dallas, Tex., on motion of Mayor Lindsley, has passed a resolution submitting the railway and lighting franchises granted by the city of Dallas to J. F. Strickland and C. H. Hobson to a referendum election. This action was taken by the Mayor when it was disclosed that the petitions being circulated asking a referendum election on the franchises were void through being improperly drawn. These franchises have been approved by the City Commission substantially as first drawn. They are to be passed in connection with the plan under which control of the present local railway and light properties will pass from Eastern to Dallas interests under terms reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Man Shortage in Bridgeport.—Charles H. Chapman, local manager of the Connecticut Company in Bridgeport, Conn., was quoted in the Bridgeport *Standard* of Jan. 8 as follows: "All big organizations have found it extremely difficult to secure the kind of men they want to work for them. Especially has this been true within the last year or so, when the demand for workers has far exceeded that of any other year. Just as an instance of this, the Connecticut Company for the year just ended hired 1111 men. Of these, there are exactly 218 now in our employ. We can't always secure the kind of men that we want. In fact, I may go so far as to state that at times dismissals reached as high as four a day. We were compelled temporarily to retain men we otherwise would have discharged through fear that we wouldn't have enough on hand to man the cars the next morning."

Toledo Paper Gets an Appeal.—On Jan. 10 Judge Denison of the United States Circuit Court allowed the Toledo Publishing Company, publisher of the Toledo *News-Bee*, an appeal from the decision of the United States Court of Appeals to the United States Supreme Court. The Circuit Court recently affirmed the sentence of the United States District Court at Toledo in which a fine was assessed upon the paper and N. D. Cochran, its editor, in contempt proceedings which grew out of articles, editorials and cartoons published in the paper, following the action of the District Court in a street railway decison. The case was appealed on error, and in its assignment of errors the publishing company claims the Circuit Court of Appeals erred in affirming the judgment of the District Court; that it should not have held the lower court had jurisdiction, and that it should have reversed the judgment on the ground that there was no evidence that the publications complained of had been read by United States District Judge J. M. Killits of the District Court at Toledo. The case grew out of the negotiations between the city and the Toledo Railways & Light Company for a renewal of the franchise of the company.

Railway Business Association Meets.—The annual dinner of the Railway Business Association was held at the Waldorf, New York, N. Y., on the evening of Jan. 16. George A. Post, president of the association, said that he hoped the Newlands joint Congressional committee, recently constituted to canvass the whole railway situation, would approach its task with breadth of mind and a desire to solve the problem for the benefit of the public. Alfred P. Thom, general counsel of the Railway Executives' Advisory Committee, expressed his belief "that every member of the joint committee on interstate commerce is convinced of the need for a real remedy." Frederic A. Delano, a member of the Federal Reserve Board, recited some fallacies which he thought were at the bottom of the public misunderstanding concerning the railway problem. At the annual meeting of the association the members re-elected as president Mr. Post, and as vice-presidents W. H. Cottingham, Cleveland; W. B. Leach, Boston; E. B. Leigh, Chicago; Henry Elliot, East St. Louis; J. S. Coffin, New York; Irving T. Hartz, Chicago, and J. C. Bradley, Buffalo. M. S. Clayton, of New York, was re-elected treasurer. In his annual address before the business meeting Mr. Post made a plea for support of the Chamber of Commerce of the United States.

Financial and Corporate

Annual Report

Bay State Street Railway

The comparative income statement of the Bay State Street Railway, Boston, Mass., for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Operating revenue	$9,996,484	100.0	$9,538,406	100 0
Operating expenses	7,764.880	77.7	6,897,752	72.3
Net operating revenue	$2,231,604	22.3	$2,640,654	27.7
Taxes	609,062	6.0	653,380	6.9
Operating income	$1,622,542	16.3	$1,987,274	20.8
Non-operating income	62,811	0.6	66,459	0.7
Gross income	$1,685,353	16.9	$2,053,733	21.5
Deductions from gross income:				
Rent of leased roads	$189,253	1.9	$182,228	1.9
Interest on funded debt	1,037,109	10.4	1,039,077	10.8
Interest on unfunded debt	86,769	0.8	104,279	1.1
Miscellaneous	27,249	0.3	25,599	0.3
Total deductions	$1,340,380	13.4	$1,351,183	14.1
Net income	$344,973	3.5	$702,550	7.4
Dividends:				
First preferred stock	$164,916*	1.7	$164.916	1.7
Common stock	102,586	1.0	512,930	5.4
Total dividends	$267,502	2.7	$677,846	7.1
Surplus for year	$77,471	0.8	$24,704	0.3

The foregoing statement is based on that appearing in the latest report of the Massachusetts Electric Companies, the controlling organization. The business of the Bay State Street Railway was favorably affected during the last fiscal year by the great manufacturing activity in parts of the territory served by its lines. As a result, its operating revenue increased $458,077 or 4.8 per cent. The operating expenses, however, increased in greater proportion, by $867,128 or 12.5 per cent, resulting in a diminution of $409,051 or 15.4 per cent in net operating revenue. The operating expenses included $120,000 for depreciation of equipment, the same charge as in 1915, and $379,759 for reconstruction non-betterment, an increase of $196,909. Prior to 1915 no charge was made for depreciation of equipment, and reconstruction non-betterment was charged off to profit and loss.

Taxes and income deductions showed slight decreases for the last year, so that the falling off in net income totaled $357,576, or more than half. The divisible remainder was not sufficient to enable the declaration of dividends in such an amount as would permit any dividend on the preferred shares of the Massachusetts Electric Companies. After paying the interest on its coupon notes, the controlling organization had, on Sept. 30, 1916, a deficit of $4,737, a decrease of $404,215 from the net income before dividends of the year previous. Since the end of the fiscal year, however, and up to Dec. 6, the date of the annual report, the gross and net income of the Bay State Street Railway has shown increases. This result has been obtained in spite of the jitney competition, which still exists, although without any increase above the estimated figures of a year ago.

During the year the following amounts were spent on new property and reconstruction: Track construction, $57,978; track reconstruction and State and municipal requirements, $374,929; cars and electrical equipment, $84,070; electric lines and feeders, $154,599; power stations, $43,426; land and buildings, $15,189; and sundry equipment, $4,264; total, $734,457.

Most of the latest annual report is devoted to a detailed consideration of various points in connection with the decision of the Massachusetts Public Service Commission in the Bay State Street Railway fare case. After taking issue with the commission in various matters, the report concludes:

"The trustees believe that the result will prove the company to have been fairly entitled to all the increases in fares which it originally requested, but it will take time to show who is right about that. We think the greater part of the criticisms contained in the opinion of the commission are unfounded, and that the ignoring of all the necessary elements of credit is a dangerous error, but no reasonable person can quarrel with the caution which desires to see doubtful matters rendered certain by actual trial before taking further action. The position adopted by the commission that the Bay State Street Railway may apply again for leave to increase fares if the changes they have permitted do not produce a proper net income, apparently indicates that the necessary relief has merely been postponed to ascertain the result of the changes allowed. The concessions granted by the commission may prove sufficient; if so, the desired result has been obtained; if not, it will be necessary to show the commission that they are insufficient.

"In the course of their opinion the commissioners stated that the present situation of the Bay State Street Railway is not one which need cause discouragement. For somewhat different reasons than those set forth in the opinion, the trustees agree with that conclusion. If the non-paying lines are made to pay, the property ought to do well enough. There can be no question that the earning possibilities of the company are better since the commission's decision than they were before. The officers of the company are making an honest and strenuous effort to do all the things advised by the commission for which the necessary means can be found, and to procure therefrom every possible dollar of increased revenue. We see no reason why the Bay State Street Railway should not resume its former condition of prosperity if it receives fair treatment from the public and the regulating authority, and we believe that it will in the end receive that treatment."

New York Lines in 1916

Railway Operating Revenues Increased 5 Per Cent During Last Fiscal Year—Net Income Gained 72 Per Cent

According to the latest annual report of the Public Service Commission for the Second District of New York, the falling off of railway operating revenues during the fiscal year ended June 30, 1915, for the electric railways under its jurisdiction did not persist during the last fiscal year. On the contrary, the railway operating revenues for the year ended June 30, 1916, represented at $32,668,000 (in round numbers) an increase of 5 per cent over those of the preceding fiscal year, while the net income showed a gain of 72.2 per cent. This was in decided contrast to the showing made in the previous year, when the railway operating revenues for the first time since the formation of the commission in 1907 showed a decrease, which in comparison with 1914 was 2.9 per cent, with the net income dropping 46.3 per cent.

To give the showing more in detail, it may be said that the railway operating expenses totaled $21,318,000, an increase of 5.4 per cent for the year, so that the net revenue from railway operation at $11,350,000 showed an increase of 4.1 per cent. The operating ratio rose from 64.99 to 65.26. Railway tax accruals increased very slightly by 0.1 per cent to a total of $1,993,000, and the railway operating income therefore rose 5 per cent to $9,357,000. The railway operating income was nearly as high as that in the highest preceding year of the series, 1914. The net revenue from other operations increased 5.5 per cent, but the non-operating income fell off 4.5 per cent, so that the gross income at $10,725,000 showed a gain of 4.5 per cent. Interest charges, which amounted to $7,636,000, showed a substantial decrease of 4.4 per cent, this being partly offset by an increase of 10.6 per cent in the $1,433,000 of other deductions, including rentals, amortization of suspense items, etc.

The net income at $1,607,000, while showing a gain of 72.2 per cent for the last fiscal year, represented a decrease of 44.0 per cent from that secured in 1907. In the ten years for which the commission has electric railway reports, in only three instances, 1910, 1911 and 1912, has the net income been greater than that in 1907. The decrease in 1916 was next to the largest during the period, the preceding decreases in 1913, 1914 and 1915 being respectively 28.4 per cent, 39.5 per cent and 67.5 per cent.

In the last fiscal year, the dividends at $2,985,000 represented an increase of 7.2 per cent, their excess over the net income figure showing that to some extent they were paid out of accumulated surplus. The total fares and transfers amounted to 643,472,000, a gain of 5.8 per cent, and the total revenue car miles to 104,396,000, an increase of 1.0 per cent. The traffic total was greater than in any preceding year, and the number of revenue car miles was greater than for any year except 1914.

The miles of road operated within New York State during the last fiscal year were 2027. It should be remembered, however, that this mileage figure is not comparable with the income and traffic statistics. While for the electric railways under the commission's supervision the traffic on lines outside the State is very much less important than in the case of steam railroads, it is still considerable. A decrease of 10 miles from the 1915 mileage figures was caused by the abandonment of the road of the Lima-Honeoye Light & Railroad Company and the St. Lawrence International Electric Railroad & Land Company.

In connection with a point emphasized in last year's report of the division of capitalization, *i.e.*, the desirability of utilities analyzing their plant account in order to learn their investment in the different classes of property and also in different localities, it is now reported that work of this character is being actively carried on by corporations owning and operating 1090 miles of track, one-third of the electric railway track mileage in the State. The fixed capital being analyzed, verified and distributed by these corporations amounted on June 30, 1916, to about $82,000,000. In previous years electric railways operating 613.33 miles of track, which represented a reported fixed capital of approximately $51,000,000, completed such work and have since continued to maintain a correct record of their investment in various classes of facilities and in the communities served. According to the commission, the verified returns of corporations which have completed such an allocation of plant costs, show a general and steady increase in the selling prices of their securities. The improvement in the market for practically all classes of securities is partly responsible for this, but it is believed by the commission that its inquiries into the balance sheet accounts, which have resulted in a verification of assets and liabilities, have had a beneficial effect upon the salability of the securities of the utilities concerned.

Boston Report Decided Upon

Legislative Committee Decided Not to Grant Boston Elevated Plea for 6-Cent Fare

The special commission created by the Massachusetts Legislature of 1916 to investigate the financial condition of the Boston Elevated Railway decided on Jan. 11 in executive session not to approve the proposed increase of fare from 5 to 6 cents when it reports to the Legislature. Lieutenant-Governor Coolidge, chairman of the commission, is reported to have said:

"The Elevated has been very anxious to have the 6-cent fare authorized. Our great problem has been to get the Elevated out of its troubles without such an increase."

He further stated that the commission has determined to recommend taking the Cambridge subway off the company's hands, together with the remission of certain franchise and compensation taxes amounting in the aggregate to about $600,000.

The commission will recommend to the Legislature that the Public Service Commission undertake a thorough investigation and examination of the financial condition of the company as well as a comprehensive study for the development and improvement of the transportation service and facilities within the metropolitan district. To Prof. George F. Swain was delegated the work of drafting the report for the committee to submit to the Legislature.

Atlanta Petitions Opposed

Leader of Recent Agitation Against Georgia Railway & Power Company Seeks to Upset Company's Financial Program

At the insistence of the committee raised at a mass meeting of sympathizers with the agitation to compel the Georgia Railway & Power Company to permit the organization of its conductors and motormen by the Amalgamated Association, the Georgia Railroad Commission on Jan. 11 postponed to Jan. 16 its scheduled hearing of the two petitions filed by the power company and of the one petition filed by the Georgia Railway & Electric Company.

One of the power company's petitions is for authority to issue non-interest bearing scrip in the sum of $420,000 for payment at the rate of $30,000 semi-annually of that amount accrued during the past four years, less $60,000 to be paid in cash, on its $2,000,000 issue of 6 per cent first preferred cumulative stock. The other petition by the power company seeks authority to issue $459,000 of first and refunding mortgage bonds. The electric company's petition is for authority to issue $283,000 of refunding and improvement bonds.

Marion Jackson, editor of *The Way*, a weekly Atlanta publication, and one of the leaders in the agitation against the power company, insisted upon the postponement. He declared that he and his associates intended to protest each of the issues, and that their attorney, Thomas B. Felder, was unavoidably absent from the city. He asked for postponement to Jan. 23. He submitted a lengthy document attacking the power company and its affiliated companies on the grounds of low wages, unsatisfactory working conditions, exorbitant charges, undue earnings and several similar grounds. The reading of the petition was interrupted and stopped by C. M. Candler, chairman of the commission, who stated that it was totally irrelevant to the issue of the hearing. Mr. Jackson stated that this document was based upon a report by F. W. Ballard & Company, Cleveland, Ohio, following an investigation by that company of the power company's affairs at the instance of himself and his associates. Among other things, the report suggested that the city of Atlanta construct and operate a municipal electric plant.

Readers of the ELECTRIC RAILWAY JOURNAL will recall that in the course of the trial of William Pollard, strike agitator, in the criminal court of Atlanta upon the charge of inciting to riot, sworn evidence was adduced that the offer had been made to the power company to call off the Ballard investigation if the power company would recognize the Amalgamated Association. This offer was characterized by President P. S. Arkwright, on the witness stand, as an attempt to blackmail the company.

Securities of Nova Scotia Company Offered

A syndicate of bankers in which Lee, Higginson & Company; Potter, Choate & Prentice and Stone & Webster are participants, are making two offerings of the securities of the Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S. The offerings consist of (1) Nova Scotia Tramways & Power Company, Ltd., first mortgage 5 per cent gold bonds due Dec. 1, 1946, at 95½ and interest to yield about 5.30 per cent, and (2) Nova Scotia Tramways & Power Company, Ltd., preferred and common stock in blocks of ten shares of 6 per cent cumulative preferred stock and three shares of common stock each of a par value of $100 for $1,000.

The Nova Scotia Tramways & Power Company, Ltd., was incorporated under a special act of the Legislature of Nova Scotia in 1914 and is the successor to the Halifax Electric Tramway, Ltd. It does the entire electric light, power and gas business and also the entire electric railway business in Halifax and serves a population of about 65,000. In addition, it is empowered to acquire water powers, land, etc., on the Gaspereaux River, 55 miles from Halifax, capable of a hyroelectric development of approximately 12,008 hp. The company has authorized $10,000,000 of first-mortgage 5 per cent gold bonds due in 1946, $2,500,000 of 6 per cent cumulative preferred stock and $3,500,000 of common stock. Of these amounts $2,250,000 of bonds, together with $1,500,000 of preferred stock and $2,500,000 of common stock, have been issued. It is explained that the purpose of the present issues of stocks and bonds of the company is to provide for the acquisition of the properties of the Halifax Electric Tramway, Ltd., and the water power rights on the Gaspereaux River and to provide adequate working capital.

Hearing on Frontier Railway

Pennsylvania and D., L. & W. Railroads Seek to Purchase Stock of Frontier Electric Railway

The Pennsylvania Railroad and the Delaware, Lackawanna & Western Railroad presented an application before the Public Service Commission for the Second District of New York at Albany on Jan. 15 for permission to purchase the capital stock and the right-of-way of the Frontier Electric Railway between Buffalo and Niagara Falls, paralleling and contiguous to the high-speed line which the International Railway now has under construction. The applicants, however, did not disclose enough of their plans and proposed developments of the road to satisfy the commission and the case was adjourned subject to call.

All of the railroad interests at Buffalo and the Niagara frontier were represented at the hearing. Assurance was given that the road would be run only as an electric line, but the proponents of the scheme did not deny that it might be used for freight as well as for passenger business.

The stock of the Frontier Electric Railway, it developed, is owned by Marshall J. Dodge of the New York banking firm of Bertron, Griscom & Company. He also holds title to the right-of-way. He owned the right-of-way of the old Buffalo, Thousand Islands & Portland line and has already sold to the International Railway space for its double track line. E. G. Connette, president of the International Railway, was present at the hearing and registered no opposition to the plans.

L. L. Babcock, representing the Delaware, Lackawanna & Western Railroad, told the commission that it was important that the plans for the development of the Frontier Electric Railway be hurried along as its powers lapse within the next few years. The company was organized in 1906, under the authority of the old railroad commission.

Brooklyn (N. Y.) City Railroad.—Frank Lyman, president of the Brooklyn City Railroad, which is operated under lease by the Brooklyn Rapid Transit Company, on Jan. 15 addressed the following communication to the stockholders of the Brooklyn City Railroad: "You have been previously advised that your directors expected to resume the payment of the full dividend of 10 per cent per annum on Oct. 15, 1917. Since the completion of the payment of the current obligations of the company on account of the settlement of the suit on Oct. 23, 1913, the books show we now have $168,000 in current cash and invested in real estate mortgages and securities. Your directors feel there should be a substantial increase in said amount of $168,000 by adding thereto $60,000 on April 1, 1917, from the quarterly rent of $300,000 to be received on said date from the lessee, so as to bring the amount up to and over $228,000 before resuming the payment of said 10 per cent dividends. Therefore, your directors now expect to resume the payment of the full dividend of 10 per cent per annum on July 15, 1917, instead of Oct. 15, 1917, as previously announced. The directors on Jan. 2, 1917, declared a quarterly dividend of 2 per cent upon the capital stock of the company, amounting to $240,000, payable on Jan. 15 to stock of record on Jan. 3."

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—The Cleveland Trust Company, trustee of the first mortgage 5 per cent bonds of the Cleveland, Painesville & Ashtabula Railroad, has notified holders of the bonds that no funds were deposited to pay the coupons maturing on Jan. 1. There are $1,000,000 of the bonds outstanding, and a protective committee has been organized in the interest of the holders. In 1906 the Cleveland, Painesville & Eastern Railroad acquired control of the Cleveland, Paines-

ville & Ashtabula Railroad. The bonds on which the interest remains unpaid are dated July 1, 1902, and are due July 1, 1922. They are not guaranteed, and the section of the road which they cover is understood to have failed for some time fully to cover its charges. E. V. Hale and J. A. House, bankers of Cleveland, have been named as the protective committee, and bonds are to be deposited with the Cleveland Trust Company.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—The Cleveland Trust Company, Cleveland, Ohio, as trustee of the first mortgage bonds of the Columbus, Delaware & Marion Railway, has filed an answer and cross petition in the receivership proceedings of that company asking foreclosure of the first mortgage. The trustee avers that the company defaulted in the payment of interest of $25,000, due on Nov. 1, 1916, on $1,000,000 of first mortgage bonds. The receiver of the company had paid practically all interest charges up to last November, but the demand for improvements in 1916 caused the expenditure of all surplus earnings, and no money was available to pay the interest maturing in November.

Commonwealth Power Company of Nebraska, Lincoln, Neb.—Liggett, Hichborn & Company, New York, N. Y., are offering for subscription at 100 and interest $750,000 of first mortgage 6 per cent gold bonds of the Commonwealth Power Company dated March 1, 1914, and due March 1, 1944, callable at any time at 105. The bankers say: "The Lincoln Traction Company of Lincoln, Neb., by agreement, reference to which is indorsed upon each bond, obligates itself to pay from the amounts due the power company, the interest charges and the sinking fund of the Commonwealth Power Company of Nebraska. By this agreement the interest charges of the Commonwealth Power Company become a part of the operating expenses of the Lincoln Traction Company, and are a prior charge to all interest charges on its bonds."

General Gas & Electric Company, New York, N. Y.—The holding of the General Gas & Electric Company in the securities of its subsidiaries on Jan. 13, 1917, was as follows: 14.8 per cent of the total bonds outstanding, 70.6 per cent of the total preferred stocks outstanding, and 95.2 per cent of the total common stocks outstanding.

Hagerstown & Frederick Railway, Frederick, Md.—Nelson, Cook & Company, Baltimore, Md., are offering for subscription at 100 and interest to yield 6 per cent first and refunding 6 per cent thirty-year sinking fund gold bonds of the Hagestown & Frederick Railway dated April 1, 1914. The authorized issue is $10,000,000 and there are outstanding at present $1,224,000. The bonds are in coupon form in the denomination of $1,000, $500 and $100. They are redeemable at 105 per cent of par with interest, at any interest period. The letter from Emory L. Coblentz, president of the railway, to the Fidelity Trust Company, Baltimore, trustee of the issue, explains that the bonds are secured by a first mortgage on practically the entire street railway system in Frederick, on almost the entire line from Frederick to Thurmont, on the company's new modern power plant, and high-tension transmission lines and substations throughout the system; and upon the entire street railway trackage in Hagerstown, as well as the branch line from Hagerstown to Williamsport, and the line from Hagerstown running eastward to Funkstown. The bonds are in addition a direct mortgage on the remaining properties of the company subject to $850,000 prior lien bonds. By a covenant in the deed of trust securing the first and refunding bonds, the mortgages securing prior lien bonds of constituent companies have been closed.

Ohio Valley Electric Railway, Huntington, W. Va.—The Fidelity Trust Company, Baltimore, Md., heads a syndicate which has bought an issue of $800,000 of Ohio Valley Electric Railway first mortgage 5 per cent bonds. With this issue the outstanding bonds of the railway amount to $1,679,000. The bonds are a direct first mortgage upon all railway property now owned or hereafter acquired.

Philadelphia (Pa.) Rapid Transit Company.—A semi-annual dividend of 2½ per cent, or $1.25 per share, has been declared out of the surplus earnings of the current fiscal year beginning July 1, 1916, upon the capital stock of the Philadelphia Rapid Transit Company, payable on Jan. 31, 1917, to shareholders of record at the close of business on Jan. 22, 1917. Last October $1 was paid on the stock, being the first disbursement since the company was formed in 1902.

West End Street Railway, Boston, Mass.—The Massachusetts Public Service Commission has authorized the issue by the West End Street Railway of thirty-year bonds to the amount of $2,700,000 bearing interest at not more than 6 per cent for the retirement of a like amount of bonds due on Feb. 1, 1917. The West End Street Railway is operated under lease by the Boston Elevated Railway.

Dividends Declared

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred B; quarterly, 1¼ per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Electric Railway Monthly Earnings

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov.,		'16	$168,131	*$120,526	$47,605	$35,741	$11,864
1 "	"	'15	156,441	*106,097	50,344	35,616	18,728
5 "	"	'16	932,957	*616,072	316,885	179,546	137,339
5 "	"	'15	869,759	*568,757	301,002	182,741	118,261

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Nov.,		'16	$103,536	*$73,866	$29,670	$29,735	†$65
1 "	"	'15	98,812	*61,537	37,275	29,623	7,652
12 "	"	'16	1,230,205	*798,411	431,794	355,949	75,845
12 "	"	'15	1,071,013	*730,036	340,977	357,315	†16,338

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., Nov.,		'16	$759,716	*$636,392	$123,324	$96,488	‡$49,557
1 "	"	'15	679,900	*487,961	191,939	100,575	‡114,719
5 "	"	'16	4,262,684	*3,214,988	1,047,696	487,891	‡703,142
5 "	"	'15	3,747,870	*2,496,831	1,251,039	493,014	‡874,177

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Nov.,		'16	$278,467	*$168,019	$110,448	$63,410	$47,038
1 "	"	'15	219,595	*127,551	92,044	62,679	29,365
12 "	"	'16	2,970,054	*1,777,194	1,192,860	754,265	438,595
12 "	"	'15	2,442,300	*1,441,179	1,001,121	765,081	236,040

GRAND RAPIDS (MICH.) RAILWAY

1m., Nov.,		'16	$102,921	*$67,706	$35,215	$17,322	$17,893
1 "	"	'15	99,020	*66,024	32,996	14,223	18,773
12 "	"	'16	1,290,412	*840,470	449,942	181,654	268,288
12 "	"	'15	1,190,353	*823,215	367,138	164,874	202,264

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Nov.,		'16	$125,610	*$86,790	$38,820	$36,263	$2,557
1 "	"	'15	112,682	*74,626	38,056	35,992	2,064
11 "	"	'16	1,468,736	*924,797	543,939	400,089	143,850
11 "	"	'15	1,263,331	*821,245	442,086	397,107	44,979

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1m., Nov.,		'16	$207,397	*$139,243	$68,154	$52,353	‡$35,795
1 "	"	'15	190,556	*114,943	75,613	53,363	‡34,408
12 "	"	'16	2,471,871	*1,518,110	953,761	630,493	‡468,476
12 "	"	'15	2,056,875	*1,204,387	852,488	665,246	‡323,387

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Nov.,		'16	$199,981	*$120,520	$79,461	$42,314	$37,147
1 "	"	'15	185,260	*11,567	67,693	42,902	24,791
12 "	"	'16	2,370,491	*1,445,906	924,585	509,791	414,794
12 "	"	'15	2,136,817	*1,313,008	823,809	498,720	325,089

NEW YORK (N. Y.) RAILWAYS

1m., Nov.,		'16	$837,383	$614,547	$222,836	$361,681	††$76,272
1 "	"	'15	1,134,595	672,139	462,456	370,532	‡140,729
5 "	"	'16	4,447,489	2,972,433	1,475,056	1,824,760	††80,416
5 "	"	'15	5,795,652	3,420,963	2,374,689	1,853,975	‡748,004

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., Nov.,		'16	$22,650	*$22,367	$283	$7,987	††$7,659
1 "	"	'15	25,092	*24,301	791	7,998	††7,157
5 "	"	'16	164,268	*127,606	36,662	39,935	††3,004
5 "	"	'15	186,660	*135,332	51,328	40,003	‡11,638

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., Nov.,		'16	$52,414	*$47,276	$5,138	$5,972	††$266
1 "	"	'15	44,264	*41,804	2,460	$5,421	††1,628
5 "	"	'16	259,309	*231,588	27,721	$31,767	‡747
5 "	"	'15	214,340	*208,158	6,182	$30,460	††16,040

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Dec.,		'16	$2,487,287	$1,396,094	$1,091,193	$813,921	$277,272
1 "	"	'15	2,213,472	1,237,668	975,804	815,497	160,307
6 "	"	'16	13,857,145	7,703,819	6,153,326	4,887,234	1,266,092
6 "	"	'15	12,416,972	6,959,936	5,457,036	4,895,793	561,243

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad, under the guarantee; also interest on notes held by the New York, New Haven & Hartford Railroad not credited to income of that company.

Traffic and Transportation

B. R. T. Efficiency Campaign

Surface Transportation and Mechanical Departments Start Series of Weekly Efficiency Bulletins as Educational Mediums

Plans in connection with the recently inaugurated joint efficiency campaign of the men and management of the Brooklyn Rapid Transit system, an announcement of which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 13, have matured rapidly enough to allow departmental educational work under the efficiency program to be instituted in the surface transportation and mechanical departments.

According to the *B. R. T. Monthly*, departmental notices announced the establishment in the surface transportation and mechanical departments respectively of a series of weekly efficiency bulletins, each of which the participants in the campaign would be expected to read one every day until the next bulletin appeared. The notices also invited suggestions and particularly solicited the co-operation of safety committees. Enrollment blanks were distributed in the various surface depots during the week of Dec. 4 to 9 and about 4800 out of a total of 5200 surface transportation department employees voluntarily signed them and turned them in as evidence of their desire to participate in the joint efficiency campaign.

In both the surface transportation department and the mechanical department the efficiency bulletin service was started with a bulletin entitled "Your Heart in Your Work and Your Mind on the Job." In the mechanical department this bulletin was followed by a bulletin on "Rules," dealing with the necessity of self-discipline, pointing out the uselessness to himself and everybody else of the man who refuses to impose upon himself any rules and the fact that such a man generally comes into conflict with the "Rules" or laws of the community and by suffering prosecution and punishment is made to feel their existence more forcibly than anyone else.

Investigation of Blue Hill Fares

Seven-Cent Fare Unit with Old Three-Zone System Discussed as Possible Solution for Any Equitable Adjustment

Financial results of the existing fare units and zone system on the Blue Hill Street Railway were discussed before the Massachusetts Public Service Commission at Boston on Jan. 3, upon petition of the selectment of Canton asking for the restoration of the former three main-line zones with three 6-cent fares. A. Stuart Pratt, vice-president of the Stone & Webster Management Association and of the railway, represented the company.

Mr. Pratt said that speaking broadly, the results of the last year and a half under the four-zone main-line system have not proved financially satisfactory for the company. The total gain on the entire Blue Hill road, resulting from the fare and zone changes ordered, was $1,862 in the year ending Oct. 31, 1916. The total revenue passengers carried, including those riding on all classes of revenue tickets, increased from 1,471,393 to 1,731,522 during the year, in comparison with those riding in the previous year, when four fare zones were in effect on the entire system, five zones being in operation under the commission's order, taking main and branch lines into account, since July, 1915.

On behalf of the company it was contended that this increase is inadequate, especially in view of the recent large increase in expenses which has unavoidably resulted from rising cost of labor and materials. Mr. Pratt said that while it has been impossible to analyze the earnings of the system sufficiently to determine the principal cause of the addition to revenue, the increased prosperity of the communities served has unquestionably been a substantial factor. At this time the company is not prepared to recommend any further fare increase, but J. A. Murphy of the Canton board of selectmen suggested that a compromise solution worked out in the board favors the establishment of a 7-cent fare unit under the old three-zone system, with workingmen's tickets at the rate of ten for 60 cents. Mr. Pratt stated that while he desired not to give a final opinion as to the merits of the proposal for a 7-cent fare unit at the time of the hearing, he was inclined to favor its trial, but for a shorter period than one year. There is no way of ascertaining, Mr. Pratt said, what the maximum practicable fare unit is on such a road, without the test of experience. The use of one-man cars is being considered, but no conclusion has as yet been reached. Mr. Pratt said that he anticipated a double-truck design for one one-man car service would be developed in the street-railway field in due course.

Courtesy a Medium for Safety Training

Application of This Principle Is Being Urged by the New York & Queens County Railway as a Direct Method for Preventing Accidents

Courtesy is the keynote of a series of educational classes for employees recently started by the New York & Queens County Railway, Long Island City, N. Y., and held in its Woodside carhouse. According to a statement made by Martin F. Lynch, assistant attorney of the company, to a representative of the ELECTRIC RAILWAY JOURNAL, the inauguration of this movement, although partly inspired by similar educational talks held in the depots of the New York Railways under the direction of James L. Quackenbush, general attorney of that company, became imperative in order to reduce the unusual number of accidents suffered by the company last fall, owing to certain local conditions. When this company was involved in a labor strike during last September, October and part of November, it became necessary to employ an unduly large number of new platform men, thus handicapping the work of administering proper instruction.

The handling of cars by untrained crews, together with the overcrowding caused by an inordinate growth of suburban travel in premature anticipation of the yet uncompleted rapid transit facilities in Queens County, contributed to an alarming number of accidents. Mr. Lynch stated that the legal department of his company met with accident cases wherein it was impossible to obtain a favorable verdict from the jury, because, as some of the jurymen afterwards admitted, they had based their judgment on previous ill-treatment which they themselves had suffered at the hands of discourteous motormen and conductors.

The new educational lectures are divided into two classes: accident prevention, given by Mr. Lynch, and proper car operation, covered by S. H. Serena, superintendent of transportation. The talks, now given three times a day when feasible, will be continued until all the employees on the system have been included, and will probably be supplemented later by moving pictures. During the February meetings it is expected to have J. W. Gerke, superintendent of maintenance, discuss the handling of car equipment from the safety standpoint. The meetings are held in a most informal manner and the men have been encouraged to participate freely in the discussions, ask questions and report any complaints they may have heard from passengers. Mr. Lynch has devoted particular attention toward encouraging polite insistence by conductors that their passengers be not permitted to stand on the platforms, a frequent source of accidents, but pass into the interior of the car. There are many patrons on this line, who, although they have been accustomed to obey the rule against platform riding on the pay-as-you-enter cars in Manhattan with which they are familiar, have shown obstinacy in this matter when riding on the non-prepayment cars of the New York & Queens County Railway.

The new lectures are claimed to have had highly successful results, the rate of accidents during the last three weeks having decreased about 50 per cent, with a marked reduction also in the number of collisions.

Autoists Warned of Danger

Secretary of State of New York Sounds Note of Warning in Letter Accompanying 1917 Registrations

In an effort to bring about a decrease in the number of grade crossing accidents 400,000 folders impressing the need of a more strict observance of "Stop, Look and Listen" are being mailed New York State automobilists by Secretary of State Hugo. In this the State automobile bureau is co-operating with one of the main trunk lines, the latter bearing the expense. A folder is now being sent with each 1917 certificate of registration.

The folder calls attention to the fact that more than 1000 persons are killed in grade crossing accidents each year in the United States and that a tenth of the number are from New York State alone. Twice the number are seriously injured. There has been a 100 per cent increase in grade crossing accidents in the last five years.

Secretary Hugo urges motorists to use care when approaching a grade crossing. The folder also carries the suggestion that motorists take no chances, but always stop or slow down and then both look and listen. So far as is known the present effort is the first of its kind between railroad and State automobile bureaus.

As has been noted previously in the ELECTRIC RAILWAY JOURNAL, the electric railways of New York are also busy at work in co-operating with automobile clubs and Secretary Hugo's office in the hopes of bringing about like results. Sunday casualties at grade crossings have become altogether too numerous. A meeting along safety-first lines will be held in the near future. Among the recommendations to be made at that time will be the following:

That warning whistles on trolley cars be of a type not producing sound which can be confused with those of an automobile horn.

That automobile horns be standardized as to volume of tone.

That steps be taken to secure legislation requiring vehicles, including horse drawn as well as automobiles, to carry lights by night that will be visible from front, rear and both sides.

That obstructions on highways outside of cities and villages precluding a proper length of vision at crossing be removed at public expense.

That obstructions on railroad companies' private rights-of-way precluding a proper length of vision at crossings be removed by the railroads at their own expense.

That obstructions on private property outside of cities and incorporated villages precluding a proper length of vision at crossings be removed by the town, county or State, legislation being enacted to that end. If such obstructions are not removed that the Public Service Commission have power upon its own initiative to order such.

That all public highway crossings of electric railways outside of cities and incorporated villages including those protected by gates or flagmen be equipped with stationary crossing signs illuminated after dark.

That stationary district signals be installed on the highways bearing the words: "Railroad Crossing, 500 ft.," the State, county or town bearing the expense.

That warning whistles on electric road begin not less than 800 ft. from a crossing and continue until the crossing is reached.

War Fund for British Columbia Employees

When the European war broke out in August, 1914, and the necessity of the Canadian Patriotic Fund was foreseen, and subscriptions were being solicited throughout the Dominion of Canada, the British Columbia Electric Railway, Ltd., Vancouver, B. C., through George Kidd, general manager, volunteered until further notice to take care of the dependents of its employees who enlisted for war service. Monthly payments to dependents were made direct by the company until the end of October, 1916, when owing to many married men who enlisted during 1916, the monthly payment aggregated a sum in excess of what the company considered it could afford to contribute. Therefore, a new arrangement was made, whereby the company, instead of making the payments direct to dependents of employees, agreed to make a monthly contribution of $2,000 direct to the Canadian Patriotic Fund, and the managing committee of the Vancouver Branch of the fund, took over the payments to the families of employees on the basis of the regulations governing the distribution of the fund.

With regard to the company's employees and their contributions to the fund the employees formed a committee at the beginning of the war and solicited subscriptions to the Canadian Patriotic Fund. Many of the employees agreed to contribute 1 per cent of their wages each month, the contribution to be deducted from the payrolls and paid over to the honorary treasurer of the fund. This amounted to approximately $480 a month. The straight 1 per cent has been adhered to until recently when Sir Herbert Ames, the honorary secretary of the Canadian Patriotic Fund, visited British Columbia for the purpose of arranging additional voluntary subscriptions, and immediately following his visit a general canvass of the cities and districts was undertaken and a large percentage of the company's employees has already increased the monthly subscriptions, and it is expected that when the canvass is completed the total monthly contribution by the employees of the railway and its subsidiary companies will be $800 or more.

Serious Head-on Collision in Western New York.—In a head-on collision on Jan. 2 on the Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y., the motormen of the cars were killed, three passengers were seriously injured and about a score of other passengers were injured slightly.

Cleveland Council Considers Street Railway Matters.—Two resolutions were introduced in the Cleveland City Council on Jan. 15, one asking the Cleveland Rapid Transit Railway Company to show cause why its franchise should not be revoked, and the other for the immediate revocation of its franchise. Both were referred to the committee on streets.

Mayor Vetoes Measure for Seats for Motormen.—Mayor George Karb of Columbus, Ohio, on Jan. 12 vetoed the Alcott ordinance which made it compulsory for the Columbus Railway, Power & Light Company to install seats on its cars for motormen and conductors. The Mayor is of the opinion that the best means of providing rest for the car crews will be determined by experiments now being made by the company.

Two-Cent Fares Upheld in Illinois.—The supremacy of the Illinois 2-cent rate for passenger travel within the State was affirmed on Jan. 13 by Judge Landis in the United States District Court, when he dismissed, for want of equity, the petition of twenty-eight railroads operating in Illinois for an injunction to restrain the State authorities from prosecuting them for establishing a 2.4-cent rate, indirectly authorized by the Interstate Commerce Commission.

Rooke Registers in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has begun the use of the Rooke register in the collection of fares on the Hamburg Avenue surface line of the Canarsie Division, which also includes the Ralph-Rockaway, New Lots, Church and Ralph Avenue shuttle surface lines. In a statement to the public the company says: "Please have your nickel ready. This will ultimately promote the convenience of both passengers and conductors, because the making of change involves discomfort to both."

Skip-Stop Discontinued.—The operation of the skip-stop on the Bloomfield line of the Public Service Railway, Newark, N. J., has been discontinued. The Board of Public Utility Commissioners of New Jersey refused formally to approve the plan, although it took occasion to say that it believed such a method of operation would benefit the people of the several communities along the line. At the same time, as certain representatives of these communities objected to a continuance of the skip-stop, because of a division of opinion among their people, the commission decided not to act against the expressed wishes of the municipalities.

Ohio Men May Urge Eight-Hour Day and Seats for Motormen and Conductors.—Street railway men in Ohio are preparing to ask the Legislature for the enactment of laws that will give them an eight-hour day and seats for both motormen and conductors. They claim that their duties are fully as exacting as those of railroad engineers and conductors, and that they should receive the same consideration. On the other hand, they allege that the railway managers are urging greater speed all the time, and that cars are becoming more overcrowded every day. This, they say, is increasing their responsibilities to such an extent that, for the safety of themselves and their passengers, the work-day should be limited to eight hours. They expect to work through the Ohio State Federation of Labor for the legislation desired.

Spokane Jitneys Worked Overtime.—According to figures given out by the Spokane Motor Bus Association, jitneys in Spokane, Wash., during the past year carried more than 4,500,000 passengers. According to the figures of the association, there are seventy-two jitney buses operating in Spokane at the present time. While some of the jitney drivers take in as high as $14 a day, a fair average is $10 per day per jitney. Some of the jitneys have two drivers; that is, the car is operated on two separate shifts. Some of the drivers run as high as twelve hours a day, but a fair average is ten hours. A large percentage of the jitneys are Fords, and they average close to 20 miles on a gallon of gasoline; other jitney buses have special carburetors, and they make between 18 and 20 miles to the gallon. Each bus in Spokane covers approximately 200 miles a day.

Prizes for Safety Records in Dallas.—Plans for "safety first" and greater courtesy on the street railways of Dallas, Tex., have been announced by Richard Meriwether, superintendent of the Dallas (Tex.) Consolidated Street Railway. Cash prizes amounting to $500 will be awarded the team making the best accident record. The award will be made at the end of the year 1917. A democratic plan has been worked out whereby the trainmen will elect the captains of the different teams. A new council of efficiency has also been created, to meet on the first Tuesday of each month. It will be composed of seven captains of the teams, the inspectors, superintendent of transportation, claim agent, and general superintendent. The council will discuss the working conditions among trainmen and all matters pertaining to the safe operation of the local street railways.

Hearing on Jan. 31 on Closed Vestibules in New York.—On recommendation of C. W. Wilder, its electrical engineer, the Public Service Commission for the First District of New York has called a hearing for Jan. 31 at which will be considered the matter of minimizing the number of accidents to passengers boarding or alighting from surface cars. Reports made to the commission indicate that the chief means of eliminating or at least minimizing such accidents appears to be the installation of closed vestibules. The question of requiring this safeguard on all cars will be considered. In his memorandum to the commission, Mr. Wilder pointed out that studies of statistics gathered by the commission showed that boarding and alighting accidents "have practically disappeared in connection with cars equipped with closed vestibules and with center entrance cars."

Street Cars Have Right of Way Over Vehicles in Oakland, Cal.—A new traffic ordinance adopted by Oakland (Cal.) City Council on Dec. 15, 1916, contains some important provisions for facilitating the movement of traffic and insuring safety. According to the new ordinance, street cars have the right of way over all vehicles at all intersecting streets not controlled by police traffic officers. In approaching street cars which have stopped or are about to stop to permit passengers to alight or board, vehicles moving in the same direction as such cars must stop 10 ft. to the rear, unless they can pass the cars leaving 6 ft. between the vehicles and the steps of the cars, in which case they may proceed at a speed not greater than 10 m.p.h. Vehicles shall not approach or cross any intersecting street upon which there are street car tracks at a greater rate of speed than 10 m.p.h.

Conference Asked on Missouri-Illinois Fares.—The public utilities committee of the Board of Aldermen of St. Louis, Mo., was asked on Jan. 10 by the Illinois Traction Company to hold a public conference with officials of Venice, Granite City and Madison, Ill., at which the passenger fare question could be threshed out. The chairman of the committee said the committee was "very busy with other matters," and expressed doubt whether a hearing would be scheduled in the near future. The company was authorized some time ago by the Interstate Commerce Commission to increase the single fare between St. Louis and the so-called tri-cities across the river in Illinois from 5 cents to 10 cents and to establish certain commutation rates at an average fare between 5 cents and 10 cents. Threats of reprisals were made by the municipalities affected and in the case of St. Louis there is a bill pending before the public utilities committee of the Aldermen seeking to repeal the company's franchise there.

Buffalo Traffic Increase Taxes Railway Facilities.—Rush-hour traffic over the Buffalo, N. Y., city lines of the International Railway is breaking all previous records. More than 250 additional trainmen are being employed and within the next few weeks forty-one new and rebuilt cars will be placed in operation. Owing to the shortage of cars during the early morning and evening rush hours, the company has been forced to use large interurban cars on some of its lines. N. H. Brown, general superintendent of transportation, says that the company is making every effort to improve its service. Additional cars have been placed on all lines; more trainmen are being employed than ever before and on the East and West Utica lines, where passengers are forced to transfer, through service is maintained during the evening rush hours; express service is maintained from the large industries in the north end of the city to all parts of the east side, and the company is meeting the shortage of electric power by generating at its reserve plants power from steam.

Buses Owned by Traction Company Operate at Loss.—The Pacific Gas & Electric Company, which operates the electric railway system in Sacramento, Cal., has in service two gasoline-driven buses which were put on in response to a demand for service in certain outlying districts not reached by the company's tracks. The buses run over different routes in the eastern annexed portions of the city, one route being about a mile long and the other about 2 miles. Both buses are Ford automobiles, fitted with special bodies, and have a seating capacity of twelve each, including driver. Although the buses have been operating several months and the routes are well established, the company states that the revenue they bring in does not cover the operating cost. Several applications for similar bus service in other suburban districts have been refused by the company after a traffic count showed what traffic could be counted upon. It is the plan, however, to continue the bus service now operating for the convenience of the patrons served.

Company Move in Interest of Public Health.—The Beaver Valley Traction Company, New Brighton, Pa., through Superintendent W. H. Boyce, has given official notice in an advertisement in the Beaver *Times* that the most rigid rules for the protection of the health of passengers on Beaver valley cars will be observed. Owing to the prevalence of pneumonia, persons are asked to use more than usual care when sneezing or coughing while riding in the cars. The order also states that the rules against spitting in the cars will be rigidly enforced without the customary warning. In commenting on this action of the company the *Times* said: "In enforcing these regulations the company has in mind only the welfare of the traveling public and it desires to make traveling as safe as possible by taking every precaution against the spread of diseases. This is only another important step in the safety first campaign which the railway has been conducting through various lines of activity for several years. To promote the safety of the public, especially that portion of it which uses the street cars daily, or occasionally, the company has spent thousands of dollars. They will continue this good work through publicity work and other effective agencies in the future."

Personal Mention

Arthur C. Hume has been elected president of the Babylon (N. Y.) Railroad.

M. Cummings has been appointed roadmaster of the Oklahoma (Okla.) Railway.

T. F. Kaap has been appointed purchasing agent of the Evanston (Ill.) Railway.

A. Gardiner has been elected secretary of the Saskatoon (Sask.) Municipal Railway.

John MacDonald has been appointed track foreman of the City Railway, Dayton, Ohio.

Walter N. Munroe has been appointed manager of the Paris (Tex.) Transit Company.

E. S. Koller has been elected president of the Denver & Interurban Railroad, Denver, Col.

F. D. Aiken has been elected president of the City & Suburban Railway, Brunswick, Ga.

Harry Murphy has been appointed roadmaster of the Columbus, Magnetic Springs & Northern Railway, Richwood, Ohio.

John Treanor has been elected vice-president of the Glendale & Montrose Railway, Glendale, Cal., with office in Los Angeles.

J. A. Spaulding has been appointed auditor of the Lake Charles Railway, Light & Water Works Company, Lake Charles, La.

John F. Esch has been appointed purchasing agent of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col.

H. C. Pinnock has been appointed claim agent of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col.

J. J. Cogan has been appointed general manager of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col.

Dwight M. Lewis has been appointed a member of the Iowa Board of Railroad Commissioners, succeeding Clifford Thorne, resigned.

E. L. Byington has been appointed chief inspector of the United Railroads of San Francisco, San Francisco, Cal., succeeding W. J. Wright.

M. McCants has been appointed assistant to William Von Phul, general manager of the United Railroads of San Francisco, San Francisco, Cal.

J. A. Guiher, a member of the Iowa Board of Railroad Commissioners, has been appointed chairman of the board, succeeding Clifford Thorne, resigned.

M. L. Ross has been appointed superintendent of the Vincennes (Ind.) Traction Company to succeed Louis J. Fohr, resigned to enter the insurance field.

George D. Murphy, master mechanic of the Columbus, Magnetic Springs & Northern Railway, has been appointed general manager to succeed Charles J. Fifer.

Edmund I. Bowen, formerly superintendent of the Rochester electric division of the Erie Railroad, has been transferred as superintendent to the Marion division of this railroad.

A. G. Hoyt has been elected president of the American Public Service Company, New York, N. Y., which controls the Marshall (Tex.) Traction Company and other utilities in Texas.

Matthew C. Brush, president of the Boston (Mass.) Elevated Railway, was elected to the board of directors of the Second National Bank in Boston at its annual meeting on Jan. 10.

H. W. Wischmeyer, superintendent of electrical equipment of the Louisville (Ky.) Railway, will hereafter also have charge of the steam equipment for the company, succeeding Frederick L. Ray, resigned.

J. A. Vandergrift, of J. A. Vandergrift & Company, engineers and contractors, New York, has been elected president of the Slate Belt Electric Street Railway, Pen Argyl, Pa., succeeding C. H. Latta, resigned.

H. D. Swain has been appointed superintendent of the Peekskill Lighting & Railroad Company, Peekskill, N. Y. He is also secretary and treasurer of the Putnam & Westchester Traction Company, Peekskill, N. Y.

A. L. Mathews has been elected a vice-president of the J. G. White Management Corporation, New York, N. Y., to take charge of a new department which has been organized for the management of sugar properties.

Henry C. Paul, treasurer of the Fort Wayne & Northern Indiana Traction Company and president of the Old National Bank of Fort Wayne, Ind., has resigned the former office to give his entire time to his duties with the bank.

J. W. Osborne, formerly master mechanic of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., has resigned that position to become master mechanic of the Terre Haute, Indianapolis & Eastern Railway, at Lebanon, Ind.

Frederick L. Ray, superintendent of steam equipment of the Louisville (Ky.) Railway, has resigned his office and gone to Indianapolis, Ind., where he has become superintendent of power plants for the Merchants' Heat, Light & Power Company.

F. S. Nicholson, for the past eight years vice-president and general manager of the Sayre (Pa.) Electric Company, will succeed Byron T. Burt as vice-president and general manager of the Rutland Railway, Light & Power Company, Rutland, Vt. He will remain a vice-president of the Sayre property.

F. J. Haas, who has been secretary of the Public Utilities Company, Evansville, Ind., has been elected vice-president and general manager of the company to succeed A. C. Blinn, whose election as vice-president, treasurer and general manager of the Northern Ohio Traction & Light Company was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1916.

Charles J. Fifer, general manager of the Columbus, Magnetic Springs & Northern Railway, Richwood, Ohio, has been appointed general manager of the Cleveland, Alliance & Mahoning Valley Railroad, with offices at Ravenna, Ohio. Mr. Fifer still retains the secretaryship of the former company. He was formerly general manager of the Philadelphia, Coatesville & Lancaster Passenger Railway, Parkesburg, Pa.

Winthrop More Daniels on Jan. 10 had his nomination confirmed by the United States Senate as a member of the Interstate Commerce Commission. Mr. Daniels, who has served two years as a member of the commission, was reappointed early in December by President Wilson for a full seven-year term. Mr. Daniels has served as chairman of the Board of Public Utility Commissioners of New Jersey. He was formerly professor of political economy at Princeton University, a chair which he held from 1892 to 1911.

Dwight Burroughs, who came to the United Railways & Electric Company, Baltimore, Md., last May as publicity manager, is editor of the new employees' magazine, *The United Railways Forum*, the first issue of which has just been published, and which was described in the News Department of the ELECTRIC RAILWAY JOURNAL for Jan. 13. Mr. Burroughs has been principally a newspaper man, although he has done some magazine and book writing and has at different times acted as publicity manager for various causes. For a number of years and up to the time of his recent position he was city editor of the *Baltimore News*.

Byron T. Burt, for the past two years vice-president and general manager of the Rutland Railway, Light & Power Company, and allied interests in and near Rutland, Vt., has resigned to take a responsible position with another organization. Mr. Burt was formerly manager of the Chattanooga (Tenn.) Electric Company until its consolidation with the Chattanooga Railway & Light Company. When the Chattanooga & Tennessee River Power Company was organized to construct the hydroelectric plant at Hale's Bar, on the Tennessee River, he was made general manager of the

company. He later resigned that position to become vice-president of the Rutland Railway, Light & Power Company.

M. F. Flatley, formerly master mechanic at the Lebanon shops of the Terre Haute, Indianapolis & Eastern Traction Company, in charge of equipment on the Northwestern, Martinsville, Crawfordsville and Lebanon divisions, resigned on Jan. 1 to become master mechanic of the Dayton & Troy Electric Railway. Mr. Flatley became master mechanic of the Terre Haute, Indianapolis & Eastern Traction Company's property in June, 1915, and was previously employed for six years as master mechanic on the Rochester, Syracuse & Eastern Railway. He was also employed by the Brooklyn Rapid Transit System as foreman of the elevated division for four and one-half years, and served three years as foreman of car equipment on the elevated division of the Interborough Rapid Transit System. He began his experience in electric railway work with the Westinghouse Electric & Manufacturing Company, where he spent three years. Mr. Flatley is the inventor of a number of car appliances.

James M. Barrett has resigned as president of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind. He has been associated with the road since it was an insignificant horse-car line, the law firm of which he is a member having continuously looked after the legal affairs of the company. Mr. Barrett resigns the presidency in order to give himself entirely to the business of his law firm. Mr. Barrett was born on a farm in La Salle County, Ill., on Feb. 7, 1852. He entered the University of Michigan in 1871, and was graduated in the academic department in 1875. He studied law at Chicago and Princeton, Ill., and afterward at Fort Wayne, Ind., and was admitted to the bar in 1876. In 1881 Mr. Barrett was elected a director and appointed counsel for the local street railway system in Fort Wayne, and thereafter he continued as director and counsel until the organization of the Fort Wayne & Wabash Valley Traction Company, which acquired the local street railway systems in Fort Wayne and the interurban lines running from Fort Wayne to Peru and Lafayette, and from Fort Wayne to Bluffton, Ind. He was then appointed general counsel for the Wabash Valley company, and continued as such until its property and franchises were acquired by the Fort Wayne & Northern Indiana Traction Company, after which he became vice-president, director, general counsel and president of that company, until his recent resignation. Mr. Barrett served as a member of the Indiana Senate in the sessions of 1887 and 1889, and was a trustee of Purdue University, Lafayette, Ind.

C. F. Handshy, assistant general manager, Illinois Traction System, was elected president of the Illinois Electric Railway Association at its annual meeting in Chicago Jan. 19. Mr. Handshy is one of the successful railway operators who has come up through the ranks to places of responsible activity. He began his career in the steam railway field as a telegraph operator for the Wabash Railroad in 1884. Six years later he became train dispatcher of the same company and in 1902 was promoted to the position of assistant chief dispatcher at Decatur, Ill. Two years later he succeeded to the position of chief dispatcher and then to trainmaster in 1905. On Sept. 15, 1907, the Illinois Traction System secured his services and he entered the electric railway field as general superintendent of transportation of interurban lines for this company. In January, 1910, he was appointed general superintendent of interurban lines, and on June 1, 1913, became assistant general manager. Mr. Handshy's nine and one-half years' experience with the problems of electric railways in Illinois should bring a constructive program to the year's activities in the Illinois Association.



C. F. HANDSHY

Obituary

Henry Gordon Stott, superintendent of motive power of the Interborough Rapid Transit Company and the New York Railways of New York, died at his home in New Rochelle on Jan. 15 after an illness of many months. He was a native of the Orkney Islands, Scotland, where he was born in 1866. On leaving the Watson Collegiate School, Edinburgh, he entered the College of Arts and Sciences at Glasgow, and began a course in mechanical engineering and electricity, graduating in 1885. In the year previous he had entered the employ of the electric illuminating company of Glasgow. Shortly after graduating he was made assistant electrician on board the steamship *Minia*, belonging to the Anglo-American Telegraph Company. The next four and one-half years saw him engaged with those duties, during which period he undertook a number of experiments that resulted in the introduction of improved methods of handling cable repairs. He was also identified with the "duplexing" of the United States Cable Company's main cable, 2750 knots, the longest duplex cable in the world.



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H. G. STOTT

In 1889 Mr. Stott was made assistant engineer of the Brush Electric Engineering Company at Bournemouth, England. The following year he was offered a position by Hammond & Company as assistant engineer in the construction of an underground cable and power plant at Madrid, Spain. He remained there until 1891, coming to the United States in that year to install an underground cable and conduit system for the Buffalo Light & Power Company, now the Buffalo General Electric Company. Later he became engineer of the company, and during the next ten years was one of the most active figures in the industrial progress of Buffalo. His efforts attracted wide attention, and in 1901 he was appointed superintendent of motive power of the Interborough Rapid Transit Company, New York City, a position which he filled with signal success. At the time he took up these duties the Interborough had not yet been organized, the company having the title of the Manhattan Railway Company. The position to which Mr. Stott was called had just been created, and it devolved upon him to organize the operating force, in connection with which he completed the Seventy-fourth Street power plant of the company, various substations and transmission lines. When the Manhattan system was amalgamated with the Interborough in 1904 Mr. Stott retained his office with the new corporation and immediately took over supervision of the construction of the power plant on Fifty-ninth Street.

Mr. Stott was elected president of the American Institute of Electrical Engineers for the term 1907-1908, vice-president of the American Society of Mechanical Engineers for the term 1912-1914, director of the Amercian Society of Civil Engineers in 1911, and was vice-president and trustee of the United Engineering Society at the time of his death. Up to the last Mr. Stott was a recognized power in the American Institute of Electrical Engineers and was a member of the standards committee, the Public Policy Committee, the Committee on Development of Water Power, the United States National Committee of the International Electrotechnical Commission, the Power Stations Committee, the Committee on Economics of Electric Service, the Edison Medal Committee, and was one of the institute's representatives on the joint committee on the metric system, of which he was an ardent advocate. Among the large number of papers which Mr. Stott wrote on engineering problems are "The Conversion and Distribution of Received Currents," "Power Plant Economics," "Notes on the Cost of Power," "Steam Pipe Covering and Its Relation to Station Economy," "Tests of a 15,000-Kw. Steam Engine Turbine Unit," "Power Plant Design and Operation," etc.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Fullerton, Cal.—The Los Angeles Railway has asked the City Council for a fifty-year franchise to construct a line in Fullerton.

Gary, Ind.—Charles D. Davidson, receiver of the Gary & Interurban Railroad, has asked the City Council of Gary for a franchise to construct extensions on Broadway, Fifth Avenue, Eleventh Avenue, Clark Road, Ninth Avenue, Buchanan Street, Virginia Street, Mississippi Street and Taft Street.

Cincinnati, Ohio.—It is reported that an ordinance has been introduced in the City Council granting authority to the Cincinnati, Newport & Covington Railway to construct a line on Third Street between Vine and Walnut Streets. The ordinance further provides for the abandonment of the present track on Second Street and on Walnut and Vine Streets, south of Third Street.

Elyria, Ohio.—The Cleveland, Southwestern & Columbus Railway has announced it would accept the franchise which had before been rejected by the company and had been twice vetoed by Mayor Charles E. Tucker and passed by the Council over his veto. The franchise grants six tickets for 25 cents and provides for extension of service to the factory district of the East End.

Dover, Pa.—The Dover-Rossville Transit Company, recently granted a franchise to operate trackless trolley cars in York County, will ask the Public Service Commission of Pennsylvania next week for permission to exercise its franchise.

Oakhurst, Pa.—The City Council of Oakhurst has repealed the franchise granted to the Johnstown Traction Company for a line through that borough. The company failed to begin work within the required period of two years after the granting of the franchise.

Union, S. C.—A franchise has been granted by the City Council for the construction of an electric railway in Union. Under the franchise the work must be begun by April 1 and some of the lines must be in operation by Jan. 1, 1918. E. F. Kelly, B. F. Kennedy and A. G. Kennedy, Union, are interested. [Jan. 6, '17.]

Salt Lake City, Utah.—The Emigration Canyon Railroad has received a franchise from the Council to construct an extension up Big Cottonwood Canyon and Little Cottonwood Canyon.

TRACK AND ROADWAY

San Diego (Cal.) Electric Railway.—The San Diego Electric Railway will begin immediately the construction of an extension from the east gate of Balboa Park to University Avenue, past the Normal School, to Adams Avenue, approximately 1½ miles. A 114-lb. rail will be used. The line will traverse a private right-of-way and will cross Powder Canyon and two smaller canyons. Steel for bridges across these canyons has been ordered.

Hillsborough-Pinellas Interurban Railway, Tampa, Fla.—The Hillsborough-Pinellas Interurban Railway has placed $2,000,000 of bonds, and construction of its proposed line to connect Tampa, Tarpon Springs, Clearwater, St. Petersburg and intermediate points, about 60 miles, will probably begin within a month. Martin Carabello, Tampa, secretary. [July 29, '16.]

Savannah (Ga.) Electric Company.—This company plans to construct an extension south on Abercorn Street to a point beyond Fiftieth Street.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—This company reports that it will construct 8600 ft. of new track during 1917, material for which has been ordered.

Chicago, Fox Lake & Northern Electric Railway, Chicago, Ill.—The Chicago, Fox Lake & Northern Electric Railway has purchased a terminal site on North Clark and Howard Streets, and will utilize the roadbed constructed five years ago by a company which abandoned its plans before any track was laid. The Public Utilities Commission of Illinois has approved a bond issue of $750,000 and enough stock has been sold to assure the immediate construction of the proposed line. L. K. Sherman, Chicago, chief engineer. [Jan. 13, '17.]

Chicago Heights Street Railway, Chicago, Ill.—This company will construct 1 mile of new track during 1917.

Kewanee & Eastern Electric Railway, Kewanee, Ill.—The Public Utilities Commission of Illinois has granted a permit to the Kewanee & Eastern Electric Railway to construct a line from Kewanee to Henry Junction, about 42 miles. C. G. Lampman, Cedar Rapids, is interested. [Sept. 9, '16.]

Union Traction Company, Anderson, Ind.—This company is erecting a new bridge at Summitville, Ind.

Cincinnati, Bluffton & Chicago Railroad, Huntington, Ind.—It is reported that J. M. Wilson, Cincinnati, who has recently purchased the Cincinnati, Bluffton & Chicago Railroad, will construct an extension from Portland to Cincinnati via Union City, Richmond and Hamilton, and from Huntington to South Bend via Columbia City and northern lake resorts.

Rumford Falls & Bethel Street Railroad, Rumford, Maine.—The Public Utilities Commission of Maine has rendered a decision authorizing the Rumford Falls & Bethel Street Railway to issue and sell at par its common stock, in an amount not exceeding $70,000, and its 6 per cent preferred capital stock, in an amount not exceeding $50,000, proceeds of such sales to be used in the work of constructing and equipping its proposed line in Mexico and Rumford. [Nov. 4, '16.]

Detroit (Mich.) United Railway.—A report from the Detroit United Railway states that the company plans to construct 29 miles of new city track and 47 miles of interurban line between Highland Park and West Utica and between Oakwood and Dearborn.

Duluth (Minn.) Street Railway.—This company reports that during 1917 it will construct 3.13 miles of city track.

Salem & Pennsgrove Traction Company, Salem, N. J.—Through operation on this company's line from Salem to Pennsgrove was not begun on Jan. 15, as announced by the company. Work had not progressed as far as had been hoped, and it is not known definitely when the line will be completed. Cars have been operated by the company for several months between Pennsgrove and the du Pont powder villages and camps at Carney Point.

International Railway, Buffalo, N. Y.—This company reports that during 1917 it will construct 32 miles of new track between Buffalo and Niagara Falls and 8.8 miles of new track in Buffalo.

Panama Traction Company, Jamestown, N. Y.—Track construction has been begun on this company's proposed line from Ashville to Panama. One bridge has been completed near Ashville and work has been begun on another bridge over Goose Creek, near Blockville. The line will be operated by motor car. B. L. Davis, Lakewood, is interested. [Dec. 30, '16.]

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York recently received bids for the construction of the Livonia Avenue elevated extension of the Eastern Parkway Subway in Brooklyn. In the effort to obtain the lowest prices in steel and steel erection, bids for the work were received in three forms. Under one form bids were received for construction including the supply of steel and under two other forms for construction, and for furnishing steel. The lowest bid for construction including the supply of steel was received from the Oscar Daniels Company, New York, at $1,775,508. The lowest bidder for construction exclusive of furnishing steel was W. G. Cooper, New York, whose bid was $257,164. The lowest bid for furnishing steel was that received from the American Bridge Company, New York, whose proffer was $1,431,755.

Toronto (Ont.) Railway.—An order was recently issued by the Ontario Railway and Municipal Board requiring the Toronto Railway to construct a double-track line on Carlaw, Guelph and Pape Avenues, and to operate a car service thereon in order to relieve the traffic congestion in the east end of the city. The company is ordered to commence work not later than April 1 next and to have it completed by July 1. Plans for the work are to be submitted to the board for approval not later than Feb. 1. The city, however, is given permission to object against the route ordered, and may suggest an alternative route. Should the city recommend an alternative plan, the board reserves the right to either approve or reject it. Should it be rejected, the order issued will stand.

Portland & Oregon City Street Railway, Portland, Ore.—It is reported that a bond issue of $350,000 will soon be made by the Portland & Oregon City Street Railway to construct an extension of its line from the present terminus 15 miles southeast of Portland to the Viola-Highland country. No plans have as yet been made for beginning the construction work.

Allen Street Railway, Bethlehem, Pa.—The Public Service Commission of Pennsylvania in an opinion handed down Jan. 15 by Chairman Ainey approved the plans for an overhead crossing to be constructed by the Allen Street Railway over tracks of the Lehigh & New England Railroad near Bath. The opinion states that the entire cost of the construction and payment of consequential damages is to be borne by the street railway company, but the railroad company, having offered to pay $2,000 toward the improvement, is directed to do so.

Hull (Que.) Electric Company.—This company reports that it will construct about 2½ miles of new track in Hull during 1917.

Jackson Railway & Light Company, Jackson, Tenn.—Improvements totaling an expenditure of about $90,000 were begun during the past year by the Jackson Railway & Light Company, which will be finished during the first half of 1917. The sum of $65,000 will be spent on laying new steel rails over the city and $20,000 will be used to enlarge the present power house of the company, on South Royal Street, to handle the increased light and power business. New rails are now being laid on Royal Street from the Nashville, Chattanooga & St. Louis Railroad depot to Allen Avenue, and work will soon be started on the laying of new rails on Highland Avenue from Main Street North. Main Street will be double-tracked to facilitate traffic from Royal Street West to Market.

El Paso (Tex.) Electric Company.—The El Paso Electric Company has increased its capital stock $1,000,000 to take care of improvements to its system. The installation of the underground wire system in the business district will cost about $300,000, it is said. Other improvements include the installation of a substation for supplying power to the Government Hill and Fort Bliss lines.

Marlin-Temple Interurban Company, Marlin, Tex.—Surveys have been completed by the Marlin-Temple Interurban Company on its proposed line from Marlin to Temple, and work of grading the line will soon be begun. S. D. Hanna, Temple, chief engineer. [Nov. 11, '16.]

San Angelo, Tex.—J. D. Sugg, formerly president of the San Angelo Power & Street Railway, has been ordered by the City Commission to remove the tracks and equipment of the San Angelo Power & Street Railway from the streets. The line will be replaced by a system to be constructed by the Interstate Electric Corporation of New York.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—It is reported that the Salt Lake & Utah Railroad has under consideration the construction of an extension to Salina Canyon.

Steubenville, Wellsburg & Weirton Railway, Wellsburg, W. Va.—It is reported that the West Penn Power Company, Connellsville, Pa., has purchased the Steubenville, Wellsburg & Weirton Railway, which operates an electric railway between Wellsburg, Follansbee, Steubenville, Holiday's Cove and Weirton. Extensions and improvements will be made.

Madison (Wis.) Railways.—This company will construct ¾ mile of new track during 1917.

SHOPS AND BUILDINGS

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has awarded to the Seventh Avenue Construction Company, New York, a contract for finishing six of the stations on the underground portion of the Southern Boulevard and Westchester Avenue extension of the Lexington Avenue subway. The stations will be located at Brook Avenue, Cypress Avenue, East 143d Street, East 149th Street, Longwood Avenue and Hunts Point Road, the station last named to be an express stop. All work is to be completed within six months, the contract price being $239,616.05.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—Practically all arrangements have been completed by this company for the construction of a passenger and freight station at the corner of Liberty and Lincoln Way East, Galion.

Toledo Railways & Light Company, Toledo, Ohio.—It is reported that a contract has been awarded by Henry L. Doherty & Company, New York, to A. Bentley & Son, 210 Belmont Avenue, Toledo, for the construction of the new power station at Toledo.

Eastern Pennsylvania Railways, Pottsville, Pa.—The carhouse and power house of the Eastern Pennsylvania Railways at Palo Alto, recently damaged by fire, will be rebuilt immediately.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company plans to construct new stations at Kaysville and Sunset this year at a cost of about $10,000. Improvements will also be made in the track facilities at the Salt Lake Union Stock Yards and it is probable that a station will be erected there.

POWER HOUSES AND SUBSTATIONS

Danville Street Railway & Light Company, Danville, Ill.—The Danville Street Railway & Light Company plans to install a 5000-kva. General Electric turbine in its powerhouse.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—Plans are being prepared by the Iowa Railway & Light Company for the construction of a powerhouse on North Sixth Street East, to cost about $20,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is reported that the Northern Ohio Traction & Light Company plans the construction of a substation at Massillon.

Reading Transit & Light Company, Reading, Pa.—This company has just placed in service a 12,500 kw. turbogenerator in addition to its former equipment. Power business already contracted for will absorb this capacity and an additional generator of 25,000-kw. capacity has been ordered for delivery in 1918 to take care of further business in prospect.

Beaumont (Tex.) Traction Company.—Plans are being considered by the Beaumont Traction Company for the erection of an electric transmission line between Beaumont and Port Arthur, and also for increasing the output of the two power plants.

Southern Traction Company, Dallas, Tex.—Plans have been made by the Southern Traction Company and the Texas Light & Power Company for the construction of a power plant on the Oklahoma side of the Red River north of Denison. The site for the plant has been acquired in Bryan County and the Oklahoma Legislature will grant the easement asked.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—A contract has been awarded by the Milwaukee Electric Railway & Light Company for the construction of an addition to its power plant at Racine to the J. F. Greene Engineering Company, Racine.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—The Milwaukee & Fox River Valley Railway, which is leased by the Sheboygan Railway & Electric Company, contemplates the construction of a hydroelectric plant, including dam across the Mullett River.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Business Announcements Trade Literature

An Invitation to Discuss Purchasing Problems

This Department an Open Forum—Discussions of Problems of Mutual Interest to Buyer and Seller Are Invited—One Subject Is Suggested

The purchasing agent of the present must be alive. Things are happening every day to change the well-laid plans of yesterday. To fulfill the requirements of his job well the purchasing agent must keep informed on the trends of the general market so that he may better be able to sense the many ups and (few) downs of his own market. He must be active in locating available sources of supply and in accelerating deliveries. In fact, the purchasing agent of to-day has a bigger job than any of his predecessors ever had.

The columns of this department have presented much evidence of purchasing activity. They have set forth the views of many important men on manufacturing and marketing conditions, and have discussed those topics which are of great mutual interest to the buyer and seller.

In the many interviews with purchasing agents and manufacturers a desire to be helpful to both has been kept in mind. This department is an open forum. Are there not questions which now might well be jointly discussed? If so, the ELECTRIC RAILWAY JOURNAL would appreciate the opportunity of presenting them.

Consider, for example, the topic of "Buying Repair Parts on an Annual Basis," which was presented on page 1184 of this paper for Dec. 2, 1916. Should an electric railway buy its material on an annual basis, with specified prices and deliveries? There are, no doubt, some materials and supplies which lend themselves very well to this method of purchase and the net results benefit both buyer and seller. Such being the case, how are prices to be fitted to possible fluctuations of the industrial labor and material market? Unless some such provision is made, long-term buying becomes speculation, and a public utility should not speculate.

In consideration of these facts, the buying of electric railway materials on an annual basis might well be discussed. The ELECTRIC RAILWAY JOURNAL will be pleased to receive the views of purchasing agents and manufacturers on this and any other topics of interest.

Railways Show Co-operative Spirit

Brakeshoe Manufacturer Reports Roads as Showing Appreciation of Present Industrial Situation

Everybody has his troubles these days, and particularly the manufacturer who supplies service and materials on a long-time contract basis. Hence, when one of them reports the cheerful co-operation of his customers tending to relieve the stress, it is a pleasure to record the facts. Frank Gordon, western sales manager, American Brake Shoe & Foundry Company, says that he and his associates deeply appreciate the way in which the electric railway managers have come to the front and have shown their appreciation of the exceptional conditions at present surrounding the sale of materials and service contracted for long in advance of the present market conditions.

Many roads purchase brakeshoes on a guaranteed basis of cost per 1000 miles. Contracts are made for a term of years. These contracts contemplate much which falls under the name, "service." They are intended to express the true spirit of co-operation. For one thing, the manufacturer supplements the work of the railway company's engineers by making extended studies of operating conditions, and by regular expert supervision, all of which is intended to reduce the cost of braking and brakeshoes. The road benefits from a reduction of costs as well as the manufacturer.

With the advent of complex manufacturing conditions, the manufacturers found that many long-term contracts were being filled at a loss due to circumstances over which neither the railway nor the manufacturer had any control. At the time contracts were made no provision for meeting present conditions could possibly have been foreseen. The prices of the metals now required for manufacturing purposes—cast-iron, steel plate, crucible steel and scrap iron—are sky-high. Steel plate, for instance, has risen from $40 to $100 a ton, and the average rise of all materials has been between 100 per cent and 200 per cent.

Relief from contract prices made earlier seemed a reasonable expectation, and this has come voluntarily from many roads which, appreciating the situation, are now cheerfully co-operating.

Warning Sounded by Wire Manufacturing Company

While Prospects for the 1917 Wire Market Are Bright Buyers of Insulated Wire and Cable Are Warned to Purchase for Actual Needs Only

Speculation is running wild over the prospects for the new year. One thing, however, is certain. The first sign that the nations of Europe are ready to consider peace proposals will be accompanied by a break in the raw-materials market and a slump in the value of stocks on hand. This statement is well borne out by the reaction in the copper market on the news of Teutonic peace proposals. Prices of raw materials are undoubtedly inflated and will therefore tumble, not far, perhaps, for some time, when peace becomes somewhat certain.

In view of these facts the following paragraphs from the current number of *The Wire Message*, published by Habirshaw Electric Cable Company, Inc., and The Electric Cable Company, are significant.

"In the insulated wire and cable industry we find evidence of sound prosperity. Statistics show that in 1914 less than 2 per cent of our total production of insulated conductors left the country, and in the favorable conditions of 1915 between 4 per cent and 5 per cent. Exporters of goods manufactured in this country, who were able previous to the war to successfully compete with European goods, certainly can do so after the war. Reasonable profits have made possible increased facilities and higher efficiency. Most factories are working overtime and orders are booked that cannot be delivered until well into 1917. Reports from all sections of the country indicate no curtailment of demand in the near future. Some decrease in purchasing activity that would bring demand near to maximum production should be welcomed rather than feared. The industry as a whole has never faced a new year with brighter prospects. It has but one thing to fear.

"WARNING

"When great business activity exists and supplies of all kinds are difficult to obtain, there is a strong temptation to over-buy. Speculation of this kind, especially at top prices, may lead to disastrous results, though basic conditions of business may be sound. Our warning is to buy for actual needs only and we cannot make this warning too strong. We reiterate our belief that the wire and cable industry, and business in general, faces a year of great prosperity, but it would be fatuous to believe that abnormal conditions

will continue to prevail. Sooner or later there must be an adjustment to the normal. When this comes those who have bought in excess of their needs will be under strong temptation to pass along their losses by endeavoring to cancel unfilled orders and outstanding contracts. This attitude is wrong, and a much harsher term might rigidly be applied to it. We are not speculating in raw materials, but are buying only to take care of orders and contracts in hand. We assume these were given us in good faith and to supply legitimate needs, and we shall insist upon the acceptance of all goods covered by such contracts and orders, under the exact terms and conditions on which they were accepted. To avoid misunderstanding we stamp all quotations and invoices as follows:

"'Owing to the extraordinary conditions which now exist, and the cost of labor and materials, all quotations made and orders accepted with the absolute understanding that material will be taken in full quantities and without change of specifications.'"

Foreign Trade Conference

At Meeting in Pittsburgh, Foreign Markets, Trade Development, and the Webb Bill Will Be Principal Topics

According to present appearances there will be a large attendance at the national foreign trade conference to be held at Pittsburgh on Jan. 24, 25 and 26 for the discussion of all after-the-war problems. The call for this trade conference has been issued by James A. Farrell, chairman of the National Foreign Trade Council and president of the United States Steel Corporation. The call asks for a study of the problems of America's foreign markets after the war, such as the foreign trade aspect of the American tariff system; co-operation in foreign trade development; the American merchant marine; foreign investment of American capital as an aid to oversea commerce; and problems of the smaller manufacturer and merchant.

An entire session will be devoted to the necessity of legislation, authorizing co-operation among American exporters who are now individually obliged, through the doubt surrounding the application of the anti-trust laws, to cope with government-encouraged combinations of foreign rivals. The legislation is provided by the Webb bill, advocated by the federal trade relations commission.

Air Brake and Signal Companies Merged

The plan for the merger of the Union Switch & Signal Company into the Westinghouse Air Brake Company, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1916, page 1279, was formally declared effective on Jan. 12. At a special meeting of the board of directors of the air brake company it was anounced that practically all of the stock of the Union Switch & Signal Company had been deposited in assent of the plan.

Later a meeting of the directors of the switch company was held for the purpose of reorganization and giving air brake officers representation on the board of directors.

The officers of the Westinghouse Air Brake Company chosen are as follows: Chairman of the board, W. D. Uptegraff, formerly president of the Union Switch & Signal Company; president, A. L. Humphrey, first vice-president and general manager of the air brake company; vice-president, John F. Miller, president of the air brake company; vice-president and treasurer, T. W. Siemon, formerly vice-president of the signal company; vice-president in charge of sales, G. A. Blackmore, formerly manager of sales of the signal company; acting vice-president and secretary, T. S. Grubbs, formerly secretary of the signal company; controller, C. A. Rowan, controller of the air brake company; auditor, F. V. Shannon, formerly auditor of the signal company; assistant treasurer, M. K. Garrett, who was associated with George Westinghouse's private office in an accounting capacity for twenty-five years.

The directors of the air brake company have called a special meeting of stockholders for March 15 to ratify the merger and also to approve an increase in the capital of the company from $20,000,000 to $30,000,000 to finance the transaction. Out of the increased capital it is proposed to declare a stock dividend of 20 per cent to holders of air brake stock, including the shares exchanged for the stock of Union Switch & Signal Company.

Car Shortage Decreased 50 Per Cent in Last Two Months

The freight car shortage which in November was becoming increasingly serious has decreased almost 50 per cent since that time, according to the figures for Jan. 1, 1917, which the American Railway Association has just made public. On Nov. 1 there was a shortage of 114,908 freight cars; on Dec. 1, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 30, 1916, page 1372, it was 107,778, and on Dec. 31 it had fallen to 59,892 cars.

This decrease in the car shortage is attributed more than anything else to the co-operative efforts of the Interstate Commerce Commission, shippers and the railroads. The latter for the past two months have had a special committee of the American Railway Association to deal with the subject. Emergency measures have been adopted to meet the abnormal situation, and progress has been made in getting cars out of the congested districts into the territory where they are most needed.

CURRENT PRICES FOR MATERIALS

Quoted Thursday, Jan. 18

Copper (electrolytic)	New York, 29 cents per pound
Rubber-covered wire (base)	New York, 38 cents per pound
Tin (straits)	New York, 45 cents per pound
Lead	New York, 7.65 cents per pound
Spelter	New York, 10 cents per pound
Rails, A. S. C. E., O. H.	Mill, $40 per gross ton
Rails, A. S. C. E., Bess.	Mill, $38 per gros ston
Wire nails	Pittsburgh, $3 per 100 pounds
Cement (carload lots) without rebate for sacks	New York, 1.97 per barrel
Cement (carload lots)	Chicago, $1.96 per barrel
Cement (carload lots)	Seattle, $2.20 per barrel
Linseed oil (raw, 5-bbl. lots)	New York, 94 cents per gallon
Linseed oil (boiled, 5-bbl. lots)	New York, 95 cents per gallon
White lead (100-lb. keg)	New York, 9¾ cents per pound
Turpentine (bbl. lots)	New York, 56½ cents per gallon

OLD METAL PRICES

Copper (heavy)	New York, 28.5 cents per pound
Copper (light)	New York, 24 cents per pound
Red brass	New York, 17 cents per pound
Yellow brass	New York, 17.5 cents per pound
Lead	New York, 6.75 cents per pound
Steel car axles	Chicago, $40 per net ton
Iron car wheels	Chicago, $19 per gross ton
Steel rail (scrap)	Chicago, $24.50 per gross ton
Steel rail (relaying)	Chicago, $30 per gross ton
Machine shop turnings	Chicago, $9.50 per gross ton

ROLLING STOCK

Columbus Railway, Power & Light Company, Columbus, Ohio, expects to purchase ten cars and, in addition, will rebuild eight cars of the summer type during the year.

Smolensk (Russia) Municipal Tramway has purchased the property of the Smolensk Electric Company. It is expected that American manufacturers will supply the necessary material and equipment to develop this property.

Cleveland (Ohio) Railway, on Dec. 26, had its plan of rebuilding fifty trail cars approved by the city council. The company has agreed to build three all-steel cars as a test but the remainder of the fifty will be a combination of steel and wood, similar to those in use at the present time.

Preston Car & Coach Company, Preston (Ontario), Canada, on Jan. 7 lost eight cars in a fire which completely destroyed the company's large erection shop. It is estimated that the total loss will be about $150,000. D. M. Campbell, managing director of the company, said that work would be resumed at once in the company's other buildings.

TRADE NOTES

Templeton, Kenly & Company, Ltd., Chicago, Ill., have furnished the Havana (Cuba) Central Railroad with two No. 318 simplex pole jacks.

Cambria Steel Company, Johnstown, Pa., is contemplating the erection of two new blast furnaces and a new plant to make car wheels. The total estimated cost is $7,000,000.

H. Denton White has been elected president of the Laconia Car Company to succeed C. S. Hawley, who resigned

to accept the position of treasurer of the Remington Arms-Union Metallic Cartridge Company.

Charles Houchin Higgins, 165 Broadway, New York, N. Y., engineer and architect, announces the removal of his offices from the Hudson Terminal to the City Investing Building. Joseph R. Greenwood will be associated with Mr. Higgins in the future.

R. N. Chipman, who for a number of years has been manager of the Atlas Preservative Company of America, Inc., is now president of the Chipman Chemical Engineering Company, Inc., which has acquired the business of the former company, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 6.

Consolidated Car Heating Company, Albany, N. Y., announces that at a meeting of the board of directors, held at Albany on Monday, Jan. 15, Frederic Pruyn was elected secretary succeeding Edward A. Groesbeck, deceased. W. S. Hammond, vice-president in charge of sales, was elected a director of the company.

Bound Brook (N. J.) Oil-Less Bearing Company announces the appointment of A. K. Smith as production manager. Mr. Smith came to this company three years ago from the American Engine & Electric Company and this appointment has been made in recognition of his faithful and valuable services.

W. F. Cutler, who has just returned from service with the troops at the Mexican border, will resume his work as vice-president of the Southern Wheel Company with offices in the McCormick Building, Chicago, instead of the Railway Exchange Building, St. Louis. In addition to his duties for the Southern Wheel Company, Mr. Cutler has been appointed assistant to the vice-president of the American Brake Shoe & Foundry Company, with headquarters at Chicago.

Moulton Engineering Corporation, Consulting Engineers, New York, N. Y., in association with the Electron Chemical Company, announces the opening of a New York office in the Woolworth building. The office will be under the direction of Horace W. Flashman, who for a number of years has been associated with the Westinghouse Electric & Manufacturing Company. The corporation is prepared to render prompt and efficient service in general, civil, mechanical, chemical and power engineering, and in addition offers the co-operation of a trained corps of experts for the development of special processes and apparatus in connection with any of the industrial arts.

A. W. K. Billings has returned from Barcelona, Spain, where he has been for the past five years as manager of construction, managing director and vice-president of the Ebro Irrigation & Power Company, Ltd., and allied interests, in charge of extensive hydroelectric construction and other work. More than 110,000 hp. has already been developed, one interesting feature being the construction, under very unusual conditions, of the largest dam in Europe. Previous to his work in Spain and elsewhere for the Pearson interests, Mr. Billings spent two years in Pittsburgh and ten years in Cuba, principally on electric railway and power plant construction, and two years in New York as engineering manager of the J. G. White & Company, Inc. He has opened an office as consulting engineer at 115 Broadway, and will devote considerable attention to work in Europe and in Latin America.

Holden & White, Chicago, Ill., general sales agents for the Joliet Railway Supply Company, announce that they have received orders from the following companies for Perry anti-friction side bearings and Hartman self-centering center plates: Des Moines City Railway, Chicago & West Towns Railway, Buffalo & Lake Erie Traction Company, Lehigh Valley Transit Company, Southern Texas Traction Company, McGuire-Cummings Manufacturing Company, Fort Wayne & Northern Indiana Traction Company, Chicago, South Bend & Northern Indiana Railway, Gary & Interurban Railroad, Baldwin Locomotive Works, Cleveland, Painesville & Eastern Railroad, Union Traction Company of Indiana, New York, West Chester & Boston Railway, St. Louis Car Company (for the Michigan Railways), Lowell & Fitchburg Street Railway, Mason City & Clear Lake Railroad, York Railways Company, and Cleveland & Eastern Traction Company.

ADVERTISING LITERATURE

Roth Brothers & Company, Chicago, Ill., has issued an illustrated bulletin describing direct-current motors and generators. The motors are shown in various industrial applications suitable for shop work.

Ohmer Fare Register Company, Dayton, Ohio, is distributing a booklet on "The Ohmer Way" of properly collecting and accounting for fares. The maintenance of these fare registers is described and sample reports from different types of Ohmer fare registers are shown.

Vanadium Alloys Steel Company, Pittsburgh, Pa., is distributing a folder descriptive of "Vasco-Marvel," a semi-high-speed steel. This folder contains considerable information regarding the treatment of this metal, together with the high speed steel standard classifications of extras adopted July 22, 1915.

General Electric Company, Schenectady, N. Y., has issued bulletin No. 46104-A describing a new type of demand meter. It is used in connection with a watt-hour meter, and consists of a demand-registering element and a timing element which record graphically the energy consumption during a definite time interval.

Portland Cement Association, 111 West Washington Street, Chicago, Ill., has issued a bulletin entitled "Concreting in Cold Weather." This describes and illustrates methods suitable for protecting the work under extreme conditions. A simple set of rules suitable for posting on the job is also ready for distribution.

Barrett Company, New York, N. Y., is distributing a booklet on the "Long Life for Wood at Low Cost," which explains where and how to use Carbosota grade 1 liquid creosote oil. Numerous illustrations are given showing decay in wooden structures due to improper or non-treatment, and in addition plans and specifications of a simple and inexpensive wood-treating plant are given. The open-tank treatment and other treatments are illustrated and described.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued leaflet 3953 on its HLD control, which is a combination of lightweight HL and PK, with all parts assembled in a single box for convenience in installation. This control was designed especially for use on the low-floor car of the fully inclosed type without platforms, which is being widely adopted for city and suburban service. This control has been developed with a capacity for handling quadruple equipment of 40 hp. motors, or the largest size ordinarily employed for low-floor cars.

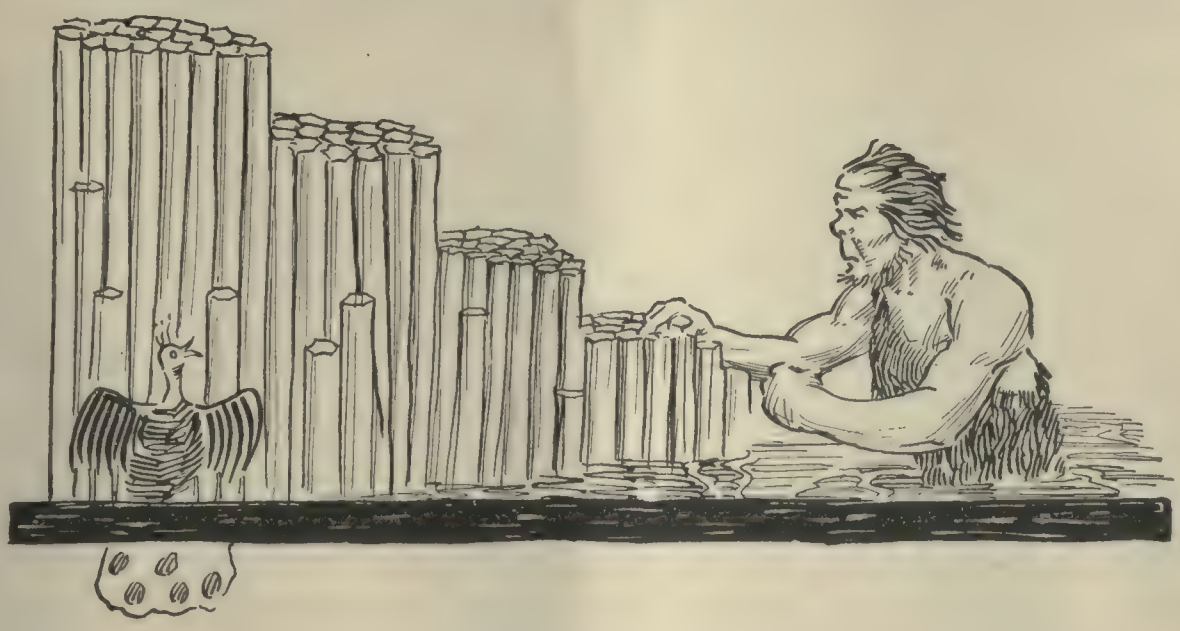
New Publications

Awakening of Business. By Edward N. Hurley. Doubleday, Page & Company, New York, N. Y. 240 pages. Cloth, $2, net.

This book, presenting the individual views of the former chairman of the Federal Trade Commission, is designed to assist business men in bettering business conditions and working out sound co-operative methods, and to bring about a closer harmony between business and government. In Mr. Hurley's opinion, business men must not be narrow-minded, and government must be a counselor rather than a policeman. As a whole, the book is a timely warning of what is demanded by the new era of business upon which the world seems to be entering.

Mathematics for the Practical Man. By George Howe, M. E. D. Van Nostrand Company, New York, N. Y. 153 pages. Cloth, $1.25, net.

Written especially for practical self-instruction, this book affords a simple and quick explanation of the elements of algebra, geometry, trigonometry, logarithms, co-ordinate geometry and calculus. It is a most valuable compendium of the general phases of mathematics which are so necessary for the understanding of technical works, and which are so easily forgotten even by the engineer when not constantly used. The book "begins at the beginning," and presents fundamentals in a straightforward yet scientific manner, without useless discursions into theory. As the title indicates, therefore, it satisfies a big want of the practical man.



The Giant's Stairs

'Way down the south of Ireland at the cliff of Carrigmahon great masses of rock rise out of the storm-tossed ocean like a flight of steps.

"Nor," as the good folk say, "are they badly suited for stairs to those who have legs strong enough to stride over a house."

That picture makes us think of electric railways which are always in danger of being shattered on the cliff of braking accidents if their legs don't prove strong enough to climb out of trouble.

We don't know of a better invigorator to help you climb out of the reach of accident waves, winds and weather than PEACOCK BRAKE emulsion—two applications per car will do it!



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An organization prepared to handle all work which calls for the application of chemistry to electric railway engineering—such as the testing of coal, lubricants, water, wire insulation, trolley wire, cable, timber preservatives, paints, bearing metals, etc.
Correspondence regarding our service is invited.
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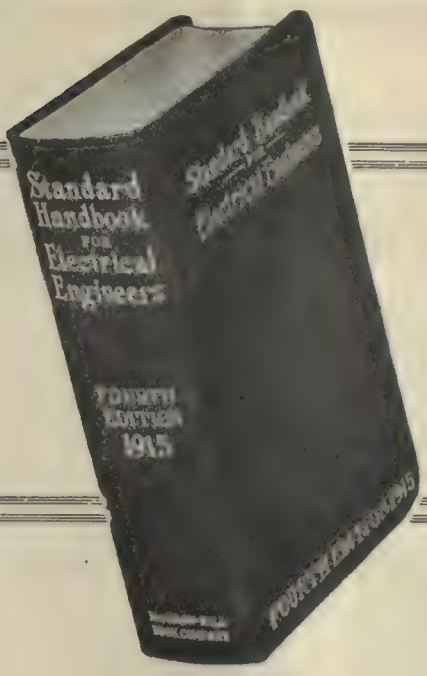
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This printing contains minor corrections and a revision of the Standardization Rules to

January 1, 1917

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Frank F. Fowle, Editor-in-Chief

The fourth edition, of which the third large printing is now ready, has been adopted almost universally as the standard reference handbook for the office, shop and engineering school.

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The joint tested was a standard socket joint between two lengths of Type M Conduit. It took 6600 volts to break through the lead cable sheath.

The high resistance of J-M fibre conduit even at the joints speaks loudly for its efficiency in guarding against stray currents and electrolytic action.

There are many other points of superiority established on test that you should know about. Ask the Electrical Department in J-M Branch nearest you.

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Reeves Wood Preserver

will mitigate the effects of rot in poles, cross-arms, ties, and all kinds of construction timber.

It is applied COLD with a brush (like paint) or by dipping in an open vat. It penetrates like ink into a blotter and checks rot in its incipiency. The least it will do is to double the life of wood. The most it will cost is but a trifle compared to the savings it will effect in purchases of new material and the cost of erection.

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Write for it to-day

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That's why we say "Try before you buy."

A gallon sample—clear or black—is yours for the asking!



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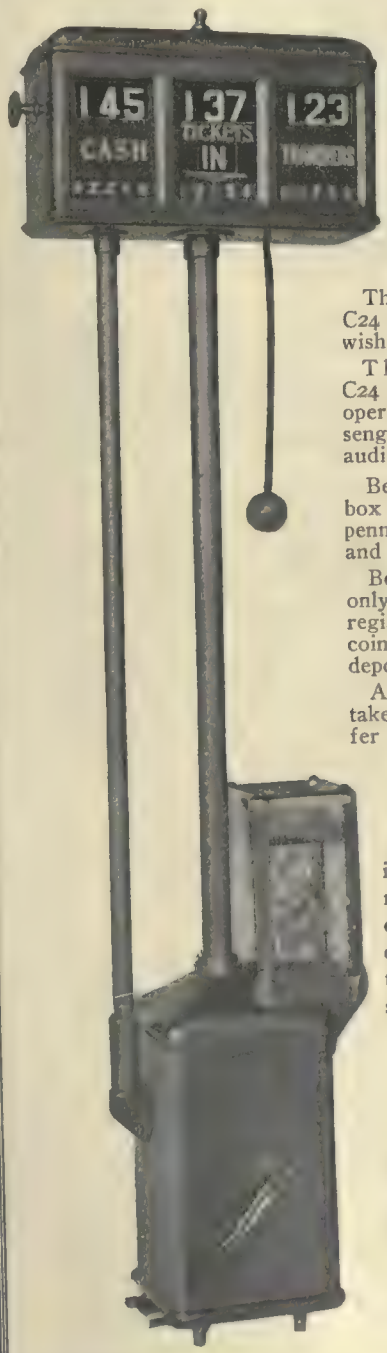


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C 24

4.8 Per Cent was added by this register to the revenues of the Lincoln Traction Company, Lincoln, Nebraska.

Their use also resulted in a material saving in cost of tickets and in the accounting department.

If you are operating single-end or center-entrance cars and want unimpeachable registration of every class of fare—



Cash—Metal Ticket Paper Transfer

The International C24 will meet your wishes to perfection.

The International C24 simplifies fare operations for passenger, conductor and auditor.

Because one farebox hopper takes pennies, nickels, dimes and metal tickets.

Because one handle only is required to register separately the coin and tickets so deposited.

A vertical pull-cord takes care of transfer registration.

The C 24

is the all-around register for single-end and center-entrance cars. Better send us your specifications.

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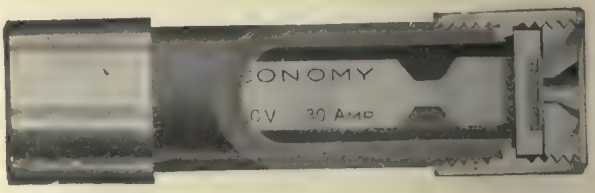
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Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully *tested Renewal Links* all ready to insert in

ECONOMY renewable cartridge FUSES

when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.



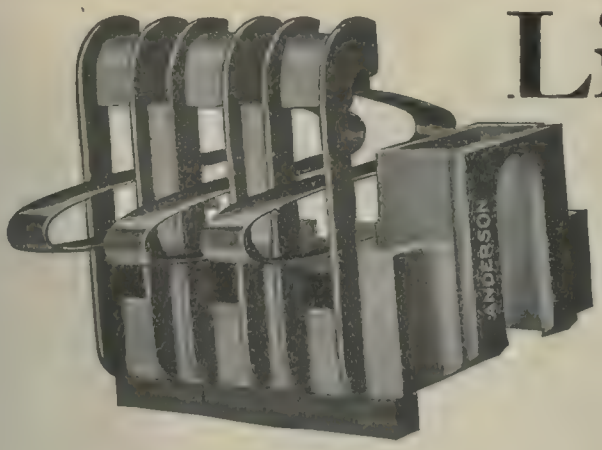
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assure a firm, even brush contact and a quick renewal or inspection of brushes.

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And there are many other big advantages which we will be glad to tell you about if you'll get in touch with our nearest office.

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Griffin service will assist you in selecting the proper size and weight for your cars.

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1326

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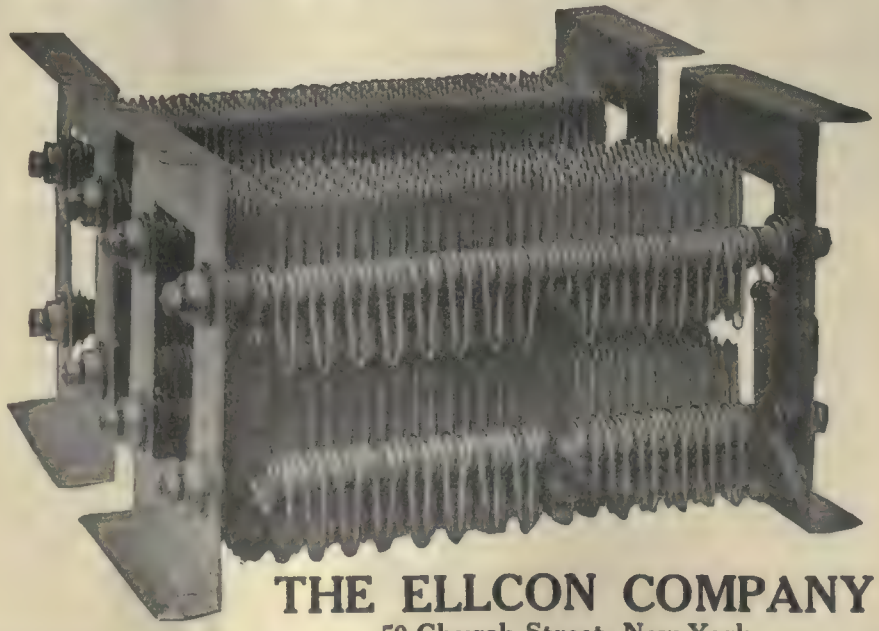
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They are abused electrically by careless operation of the controller.

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E M B grid resistors actually have made this part of your equipment troubleproof.



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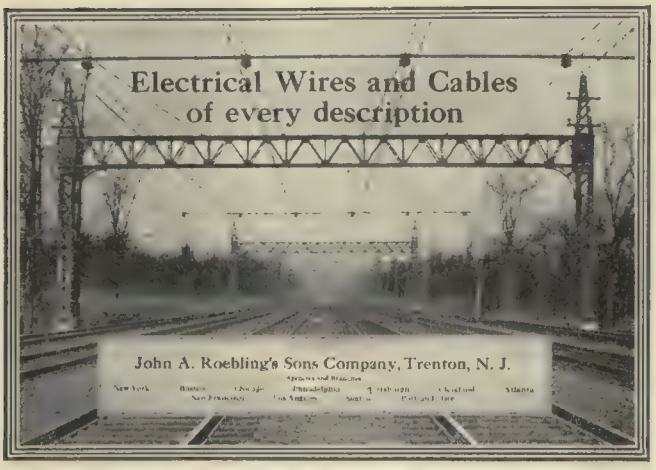
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And all kinds of **Electrical Conductors**

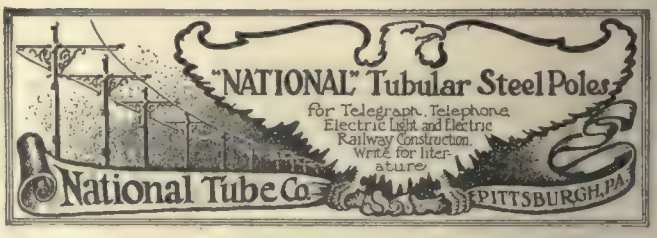
Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information.

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TREATED POLES, CROSS ARMS, TIES, TIMBERS, PAVING BLOCKS

CAPACITY 100,000,000 FEET B. M. PER ANNUM
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We use C-A-Wood-Preserver in Treating

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Three Section Tower Outfits to fit any make of chassis.
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Fibre Track Insulation

DIAMOND STATE FIBRE CO.
Elsmere, Del. Bridgeport, Penna. Chicago, Ill.

TOOLS

for all classes of electrical construction and repair work. Write for catalog.

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Let the Car Signal for You!



Nachod Signals

are automatically set by the car. You do not take a chance with your motorman's memory. Every car is automatically guarded. Buy now; pay later.

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STEEL POLES

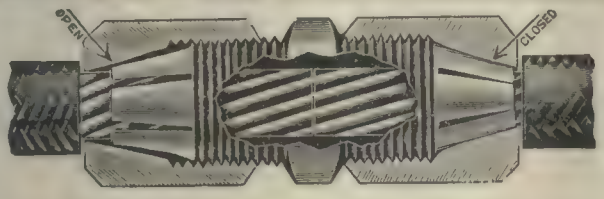
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Bates Steel Poles in use by the DES MOINES CITY RAILWAY, Des Moines, Iowa, U. S. A.

Strongest STEEL POLE of like weight in the world.
Best STEEL POLE in the world for electric railway trolley service.
Most artistic STEEL POLE in the world for any service.
We make the lowest prices.
We have constantly on hand about two thousand tons of steel and can make immediate shipments.
A full line of convenient malleable fittings.
Our steel pole TREATISE tells a big story, ask for it.

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Make Splices Easy to Open Up, Too

All you need is a wrench to open up a splice or make it up again, if you use

FRANKEL SOLDERLESS CONNECTORS

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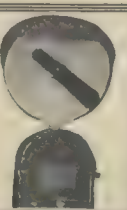
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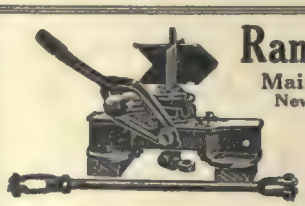
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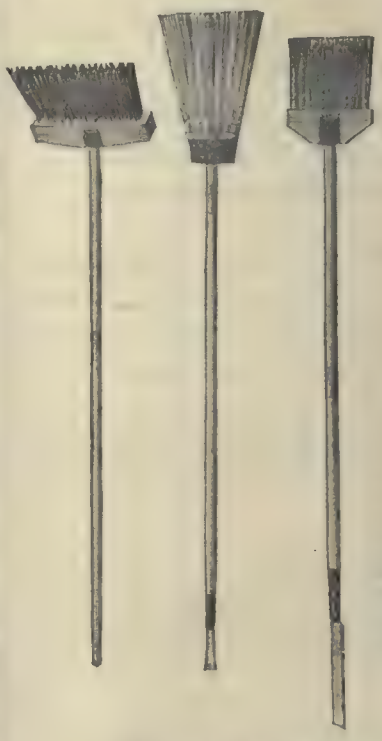
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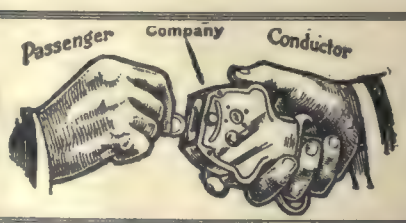
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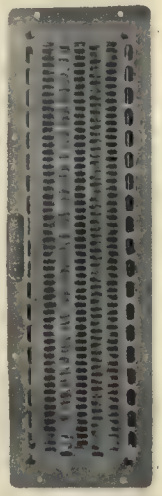
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Length over cab	32' 6"
Height over cab	12' 1"
Width over all	10' 1"
Total wheel base	29' 0"
Rigid wheel base	12' 0"
Track gauge	4' 8½"
Total weight	172,500 lbs.
Weight on drivers	117,200 lbs.
Maximum safe speed	60 MPH.
Minimum radius curvature	150 ft.

EQUIPMENT:

Four G.E.-94 bipolar gearless motors with type M multiple unit control; combined straight and automatic air brake; two 16" electric headlights; air operated bell; whistle; pneumatic sanders, etc.

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Control equipment is arranged for three economical running speeds; slow for switching service, medium for freight service and high speed for fast freight and passenger service.

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WE CAN CUT YOUR COST OF HEATING CURRENT

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ELECTRIC HEATERS Cut Installation and Maintenance Charge

VENTILATORS Also Ventilate in Stormy Weather.

THERMOSTATS Save Current

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Write for Price and Full Particulars to

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ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

⅛ p. (1⅛x3⅜ ins.)	$5 00	1 in. (1x2⅛ ins.)	$3.00
¼ p. (2⅜x3⅜ ins.)	10 00	4 inches (4x2⅛ ins.)	11 60
¼ p. (5x2⅜ or 2⅜x7 ins.)	20 00	8 inches (8x2⅛ ins.)	22 40
½ p. (10¼x3⅜ or 5x7 ins.)	40.00	15 inches	40.50

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

1 page	$80 a page	18 pages	$56 a page
3 pages	72 a page	26 pages	52 a page
6 pages	64 a page	32 pages	50 a page
9 pages	62 a page	40 pages	48 a page
12 pages	58 a page	52 pages	45 a page

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE

Galvanized Wire for Sale

Have on hand considerable tonnage of galvanized smooth wire, 4, 6, 7, 8. Also 4 and 8 annealed. Has been wet, but in good condition for use. 100 tons bundling wire; 75 tons flat iron hoops. Odd size nails, etc. Write for list, samples and prices. Nichols Wire Company, Kansas City, Mo.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

Equipment for Sale

600 Kw. direct connected a.c. unit, consisting of one Harrisburg cross compound condensing engine; 4 valve; diam. cylinders, 24" and 46"; stroke, 27"; r.p.m., 120; i.h.p., 800; diam. steam pipe, 10"; exhaust, 20"; steam pressure, 145 lbs.; cut-off, 0.29; vacuum, 26".

Generator G. E., type A. T. B., No. 71078, class 60-600-B-120; form E; volts, 11,000; speed, 120 r.p.m.; amperes, 32.

Control panel and oil switch included.

Prompt shipment can be made.

The American Railways Company, Witherspoon Building, Philadelphia, Pa.

PRACTICALLY NEW

STEEL RAILS 60 lb. A. R. A. Section Series "A." Laid but never used. 4½" high, **with angles.**

Don't overlook this opportunity to secure New Rails at less than mill cost and for immediate delivery.

CARS

15—Rodgers Ballast, 36 ft., 60,000 Cap. Center Dump—Pass M. C. B. Requirements.

Prompt Shipment—Low price to move quick.

LOCOMOTIVES, CARS, EQUIPMENT, MACHINERY, TANKS, ETC.

Write for 40-page Bargain List.

ZELNICKER
WALTER A. ZELNICKER SUPPLY COMPANY
in St. Louis

First Nat'l Bk., Chicago Hennen Bldg., N. Orleans
Main Office: 325 Locust St., St. Louis
What have you to sell?

FOR SALE

Trolley Wire for Sale

5081 feet of 1/0 trolley wire—new—can make immediate delivery. Address H. A. Sawyer, Manager, Amesbury, Mass.

Generator for Sale

One Thompson-Houston Electric Company Class MP 75 No. 119 500 volt, 750 r.p.m. generator. Immediate delivery. Box 1335, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

Rails for Sale

140 gross tons 6"-62 lb. Penna. sec. 242 relaying tee rail, with continuous rail joints; 20 tons 25 lb. 2¾" high relaying tee rail. Chattanooga Railway & Light Co., Chattanooga, Tenn.

Fare Boxes for Sale

100 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

MISCELLANEOUS

Several Frequency Changers Wanted

3 phase, 25 cycle motor, with 33,000 volt transformers, and 3 phase, 60 cycle generator, 2300 volts; capacity 1500 or 2000 kw. or multiples of same. Separate motors or generators would be considered. Box 1328, Elec. Ry. Jour.

POSITIONS WANTED

AUDITOR; 12 years' continuous experience in electric railway accounting, solicits position with railway requiring efficient man familiar with handling large properties, systematizating and consolidating companies a specialty. Wish to locate with growing concern where executive ability counts. Married, age 33. Box 1337, Elec. Ry. Jour.

DRAFTSMAN and designer, experienced on cars and trucks, wishes work to do at home. Your ideas perfected; tracings made. Box 1331, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

EFFICIENT manager of railway and lighting properties open for engagement. Can put your road on paying basis. Salary, $6,000. Box 1315, Elec. Ry. Jour.

GENERAL Manager wishes a change. Over 20 years' active experience in electric railway and lighting business. In executive capacity 10 years. Efficiency work a specialty. Box 1332, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS WANTED

GENERAL shop foreman of large property desires position as master mechanic of smaller shop. Familiar with both interurban and city equipment. Box 1319, Elec. Ry Jour., 1570 Old Colony Bldg., Chicago, Ill.

MR. Railway Builder, Owner, Manager—Am superintendent of power company, but want to change to traction or combination. Thirty, married, technical graduate, nine years' experience. Can handle level and transit; have superintended highway work; can handle construction work. Can fill the bill from turning of sod to scheduled operation of system. Need a Live Wire? No lottery number. Write to H. H. Fenton, Blue Rapids, Kan.

PARK Manager, commission or temporary basis. Previous experience guarantees absolute satisfaction. Utilize my advice immediately concerning attractions and concessions necessary to greatest success this year. Box 1334, Elec. Ry. Jour.

TRAFFIC man—Ten years' experience, steam and electric. Age, 27. Single. Best references. Now traffic manager electric line. Desires change. Position with mercantile house preferred. Box 1338, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

YOUNG man, six years in executive offices large Eastern street railway and lighting company. Now law clerk legal department. College graduate; member of bar. Can handle legal and claim work. Good assistant to busy executive. Box 1223, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS VACANT

COMPETENT track engineer for street railway work wanted who has had experience in handling men successfully. Please furnish record, references and salary expected. Box 1329, Elec. Ry. Jour.

DRAFTSMAN for master mechanic's office wanted. Must have good electrical and mechanical knowledge and strictly sober. State experience and salary expected. Box 1320, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.

WANTED at once, car barn electrician capable of rewinding railway armatures and maintaining electrical equipment of eight cars and one electric locomotive. Give full information of experience and salary expected in first letter. Trinidad Elec. Transmission Railway & Gas Company, Trinidad, Col.

WANTED—A superintendent for roadway and overhead electric lines. Must be both practical and technical. Between the ages of 35 and 45. State age, experience and salary expected, with references. Box 1323, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.
If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will probably furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device Co.

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axles.
National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers.
National City Co.

Batteries, Dry.
Johns-Manville Co., H. W.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Materials.
Hardy & Sons Co., Wm. A.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones B. & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Hess-Bright Mfg. Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Boiler Tubes.
National Tube Co.

Bond Clips.
Electric Railway Improve. Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improve. Co.
Ohio Brass Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Bonds, Soldered.
Horne Mfg. Co.

Bonds Welded.
Lincoln Bonding Co.

Book Publishers.
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Int'l Creosoting & Constr. Co.
Lindsley Bros. Co.
Ohio Brass Co.
Union Electric Co.

Brake Adjusters.
Holden & White.
Kerschner Co., Inc., W. R.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
General Electric Co.
Holden & White
Long Co., E. G.
National Brake Co.
National Safety Device Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Bridges and Buildings.
American Bridge Co.

Brooms, Track, Steel or Rattan.
Paxson Co., J. W.
Zelnicker Supply Co., W. A.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Carbon.
Dixon Crucible Co., Jos.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders.
Anderson Mfg. Co., A. & J. M.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunkers, Coal.
American Bridge Co.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—(See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co., Inc., W. R.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Car Stops, Automatic.
Consolidated Car-Heating Co.

Castings, Brass.
Frankel Connector Co.
More-Jones B. & M. Co.

Castings, Composition or Copper.
Anderson Mfg. Co., A. & J. M.

Castings, Gray Iron and Steel.
Amer. Brake Shoe & Fdry. Co.
American Bridge Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Horne Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Union Electric Co.
Wood Co., Chas. N.

Ceiling, Car. (See Headlining.)

Charging Sets, Storage Battery.
General Electric Co.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps.
Frankel Connector Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Cleats, Car Wiring.
General Electric Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature & Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cameron Electrical Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
Westinghouse Elec. & M. Co.

Compressors, Air.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits, Underground.
Johns-Manville Co., H. W.



Is YOUR Capital Gathering Cobwebs?

It is if any of it is tied up in old field coils.

We can help you put these coils to work again. Send them to us and let us reconstruct them. We remove the old insulation—clean and anneal the copper—then reinsulate it with

SALAMANDER PURE ASBESTOS

which is, in itself, a guarantee against carbonization due to age and breakdown under overload. We then rewind the wire into new coils having just the same characteristics as the old ones.

It's *better* than selling your old coils—and *cheaper* than buying new ones, for our only charge is for the actual insulation used. Ask us to demonstrate the economy of our method.

Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.



THERE has been no other factor in creating the prestige which now surrounds the Weston name than the outstanding superiority of

Weston

Indicating Instruments

Model 341
A. C. and D. C.
Voltmeter

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D. C. Wattmeter, Model 329 Polyphase Wattmeter and Model 370 A. C. and D. C. Ammeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1 per cent full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

So high have Weston products established the name in the field of Electrical Measurement that it is in itself an endorsement of each instrument that bears it.

It is our fixed purpose to maintain and, if possible, to increase the value of this endorsement.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits, instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

Weston Electrical Instrument Co.
21 Weston Ave., Newark, N. J.

New York, Boston, Philadelphia, Pittsburgh, Buffalo, Cleveland, Chicago, St. Louis, Richmond, Denver, Cincinnati, Detroit, San Francisco, Toronto, Montreal, Winnipeg, Vancouver

JACKS

Barrett Track and Car Jacks
Barrett Emergency Car Jacks
Duff Ball Bearing Screw Jacks
Duff Motor Armature Lifts

The Duff Manufacturing Co., Pittsburgh, Pa.

VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.
2325 So. Pauling St., Chicago, Ill.

The "Hycap-Exide" Battery

for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

"Boyerized" Products Reduce Maintenance

Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago Washington, D. C.

RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels

Special Agents for { Tool Steel Gear & Pinion Co. / Johnson Fare Box Co. / C. & C. Electric & Mfg. Co. / Holden & White }

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Connectors, Solderless.
Frankel Connector Co.

Controller Fingers.
Horne Mfg. Co.

Controller Handles.
Horne Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Johns-Manville Co., H. W.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
American Bridge Co.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Union Electric Co.
Samson Cordage Works.

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Cincinnati Car Co.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes. (See also Hoists.)
Niles-Bement-Pond Co.

Creosoting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Culverts.
American Rolling Mill Co.
Bark River B. & Culvert Co.
California Co. Culvert Co.
Canton Culvert & Flume Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Culvert Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Mfg. Co.
Lee-Arnett Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Cul. Co.
North East Metal Co.
Northwestern Sheet & I. Wks.
O'Neill Co., W. Q.
Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.
Sioux Falls Metal Cul. Co.
Spencer, J. N.
Spokane Corr. Cul. Co.
Tennessee Metal Culvert Co.
Utah Corr. Cul. & Flume Co.
Virginia Metal & Culvert Co.
Western Metal Mfg. Co.
Wyatt Mfg. Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart.
Pantasote Co., The.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co.

Despatching Systems.
Simmen Automatic Ry. Sig. Co.

Destination Signs.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service.
Wisch Service, P. Edward.

Door Operating Devices.
Consolidated Car-Heating Co.
National Pneumatic Co.

Doors, Asbestos.
Johns-Manville Co., H. W.

Doors and Door Fixtures.
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

Doors, Folding Vestibule.
National Pneumatic Co

Doors & Shutters, Fireproof.
Kinnear Mfg. Co.

Doors, Steel Rolling.
Kinnear Mfg. Co.

Draft Rigging. (See Couplers.)

Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.
Union Electric Co.

Dryers, Sand.
Electric Service Supplies Co.
Union Electric Co.
Zelnicker Sup. Co., W. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The.
Burch, Edw. Po.
Byllesby & Co., Inc., H. M.
Ford, Bacon & Davis.
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Roosevelt & Thompson.
Sanderson & Porter.
Scofield Engineering Co.
Stephenson Sons Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

Engines, Gas and Oil.
Westinghouse Elec. & M. Co.

Engines, Steam.
Westinghouse Elec. & M. Co.

Fare Boxes.
Brill Co., The J. G.
Cleveland Fare Box Co.
Internat'l Register Co., The.
Johnson Fare Box Co.

Fences and Fence Posts.
American Steel & Wire Co.

Fencing Wire.
American Steel & Wire Co.
Page Woven Wire Fence Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Cincinnati Car Co.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Horne Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Star Brass Works.

Fibre.
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

Fibre Insulation.
U. S. Metal & Mfg. Co.

Fibre Tubing.
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Field Coils. (See Coils.)

Filters, Water.
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus.
Johns-Manville Co., H. W.

Fire-Proofing Materials.
Johns-Manville Co., H. W.

Flooring Composition.
American Mason Safety Tread Co.
Johns-Manville Co., H. W.

Forgings.
Standard Steel Works Co.

Frogs, Track. (See Track Work.)

Furnaces. (See Stokers.)

Fuses and Fuse Boxes.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Fuses, Refillable.
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.

Gaskets.
Diamond State Fibre Co.
Horne Mfg. Co.
Johns-Manville Co., H. W.
Power Specialty Co.

Gas Producers.
Westinghouse Elec. & Mfg. Co.

Gates, Car.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.

Gages, Oil and Water.
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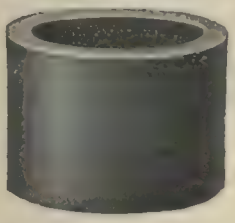
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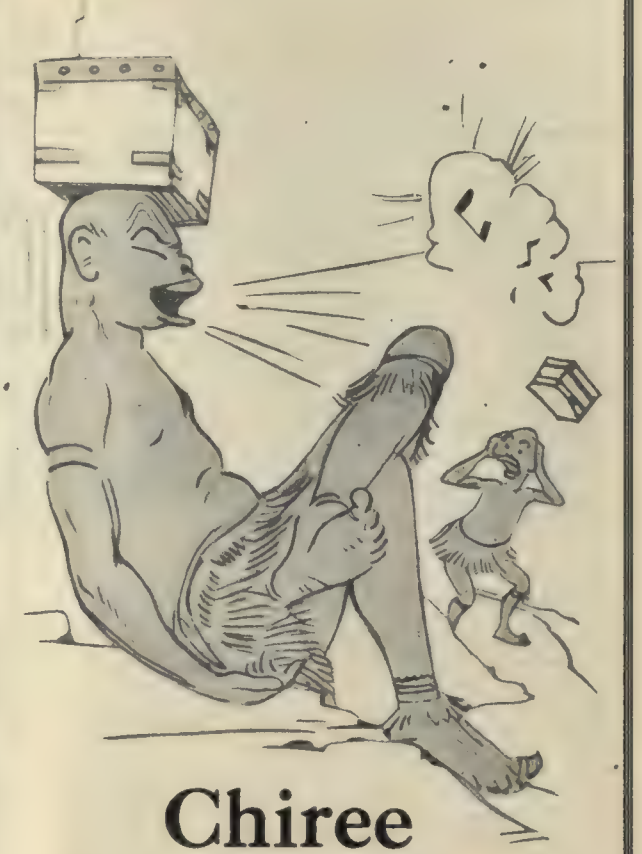
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Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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The Owners of These Fine Homes Don't Want to Be Disturbed

by the dirt, dust and delay inevitable to retracking and repaving.

To be sure, rails must be renewed some time, but why not keep your streets clear, your cars moving and your public happy just as long as possible?

THE USE OF TITANIUM-TREATED RAIL

should not be limited merely to places of exceptional traffic. It will pay in revenue and good relations to use it everywhere.

The Los Angeles Railway, the Boston Elevated Railway and the Pittsburgh Railways are some of the roads that use Titanium-Treated rail in residential districts, too.

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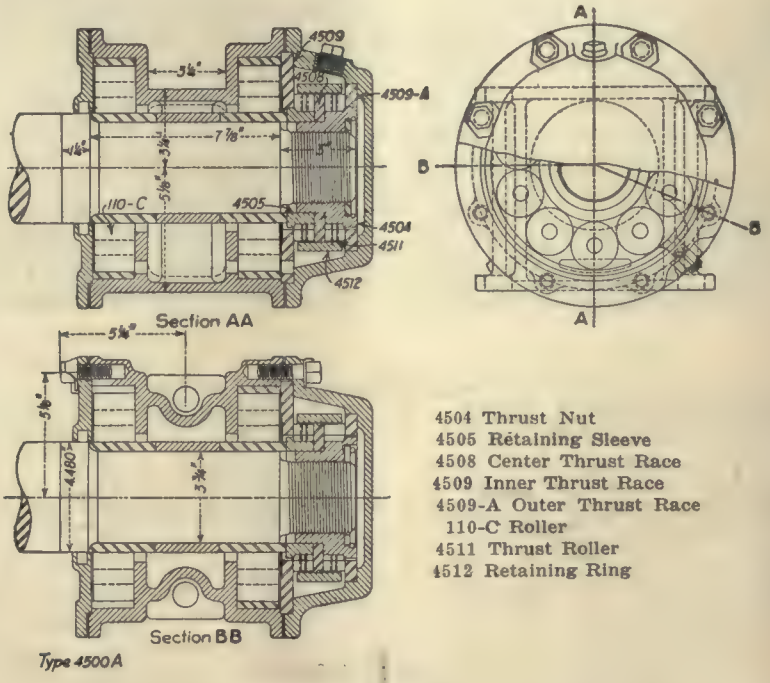
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Syracuse Installs Eighty Railway Roller Bearings



4504 Thrust Nut
4505 Retaining Sleeve
4508 Center Thrust Race
4509 Inner Thrust Race
4509-A Outer Thrust Race
110-C Roller
4511 Thrust Roller
4512 Retaining Ring

Here is a drawing of the type 4500-A Railway Roller Bearings, eighty of which have gone on ten new Peter Witt center-door pay-leave cars for Syracuse.

In equipping these cars, the railway company sought for the most efficient devices available for economical, efficient and reliable car service.

If the decision of Syracuse is significant to you, write us on how to

Put Railway Roller Bearings on Your Cars



The Railway Roller Bearing Co.

Syracuse, N. Y.

Brill Renitent Post for Car Windows

UNTIL very recently, in building cars with steel upper framing, it was customary to use T-posts and attach to them the grooved wooden runways for sashes and curtains and also the wooden pilaster. This method of construction had the disadvantages imposed upon it by the tendency of the wood to swell when subjected to dampness and moisture. Consequently the desire for an all-metal post early became felt and the result has been the Brill Renitent Post, one of the greatest achievements in modern car construction—a post which makes possible a sash that will not rattle, will not leak water, is interchangeable, easily removed without tools and safe from dropping. The post consists of a spring-brass casing fastened by means of clips to stirrups which are riveted to the T-posts. Thus the casing is readily removable should it be necessary to get at the T-post for inspection or to make repairs in case of collision. The sash is held by its spring casing so that it makes a snug fit and yet may be raised or lowered readily. The tension of the casing on the sash stiles is sufficient to guard against accidents to the hands or arms of passengers, it being impossible for the window to drop suddenly. Time is saved in the removal of the sash, tools not being needed. Superhuman strength and painful wrenching at the sash are unnecessary, the pressure of the casing against the sash stiles, however, preventing the sash from coming out of its runways as the result of the casual pressure exerted by a passenger raising or lowering the window. Also, no wind pressure, no matter how great, can move the sash from its proper position. Recent orders upon which the Renitent Post was used include cars built for Boston, Wilkes Barre & Hazleton, Public Service Corporation, Detroit, Michigan, and for Dayton, Ohio.



Patented and Patents Pending in United States and Foreign Countries

BRILL

New Service in Des Moines

This is one of the new all-steel cars which are part of the rehabilitation plan under a new franchise in Des Moines, Iowa.

Forty-six of these cars, each equipped with four G-E 258 Motors, K-35 control and C-P 25 Air Compressors, are now in service.

The power system has also been strengthened by a G-E Portable Automatic Substation—the first of its kind to be built.

Des Moines is now fortified against unsatisfactory service and excessive maintenance and operating costs.

6710



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General Offices
Schenectady, N.Y.

Sales Offices
in all large cities

ELECTRIC RAILWAY JOURNAL

New York, January 27, 1917 McGraw Publishing Co. Inc. Vol. 49, No. 4 10c a copy



All Types of Passenger Cars these products protect passengers from rain and sun nd provide the highest economy of construction and finish for operating companies. appearance they are fine enough for any car—no matter how ***luxurious.*** And their rability makes them an economy for every car.

The Pantasote Company

Broadway, New York 797 Monadnock Building, San Francisco, Cal. People's Gas Building, Chicago, Ill.

Westinghouse

HLD Control

On the Great White Way—Broadway



WESTINGHOUSE ELECTRIC

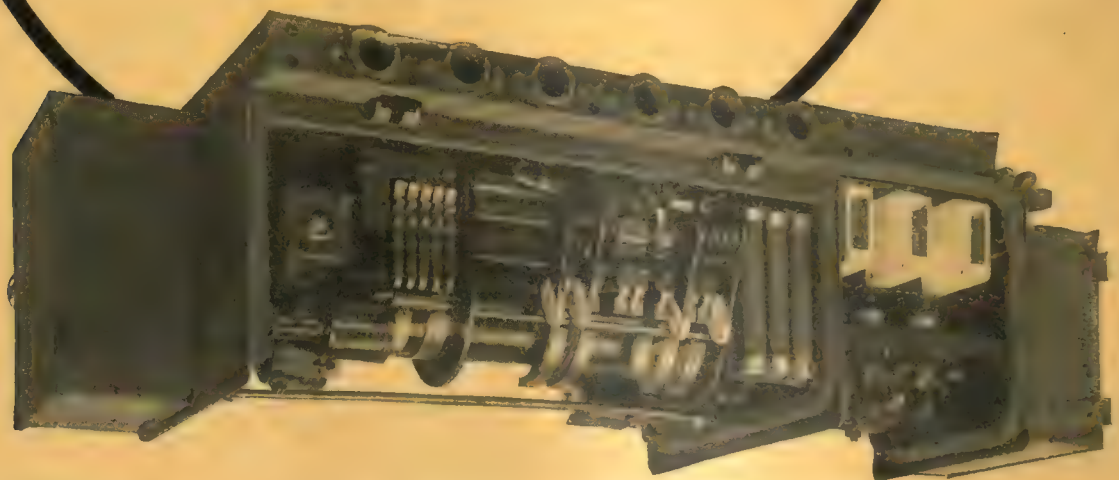
The most severe test for controllers is without doubt on the Broadway cars in New York.—The motormen are almost continuously operating the controller.

The Westinghouse Electric Co. developed the "PK" Control to meet these severe conditions when the 175 stepless cars were placed in service three years ago.—The "PK" Control was such a marked success that it has been rearranged, making it suitable for mounting on all types of low-floor, or old standard cars.

All of the modern and highly successful features of HL Control have been embodied in its design,—hence we now designate it as HLD Control.

Our Leaflet No. 3953 gives particulars about HLD Control Send for a copy

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.
Sales Offices in All Large American Cities



HLD Control Box with Cover Removed

ELECTRIC RAILWAY JOURNAL

VOLUME XLIX, No. 4 NEW YORK, JANUARY 27, 1917 PAGES 147 TO 192

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Circulation of this issue 7300 copies





The Westinghouse Inspector-Specialist is a practical railroad man, direct from the car-barn ranks. He knows the air-brake game from A to Z. Moreover, he knows how to impart his knowledge to others, whether it be to the barn-man to procure the best possible conditions of air brake equipment, or to the motorman to guarantee safety and to improve transportation movement.



"It is largely because of the Westinghouse Inspector-Specialist's close co-operation with our men that we are able to handle our cars better than ever before. His work with our barn-men is equally efficient. The majority of our compressors have never been down since first installed eight years ago, and at present rate of going will hang for eight years more." (Recent remark of a Street Railway Manager.)

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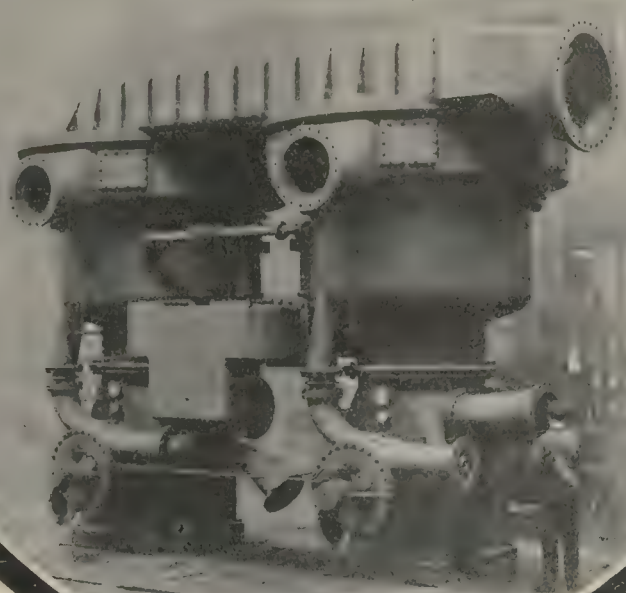
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Westinghouse

Jet Condensers



W
WESTINGHOUSE ELECTRIC

Larger and Larger



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Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

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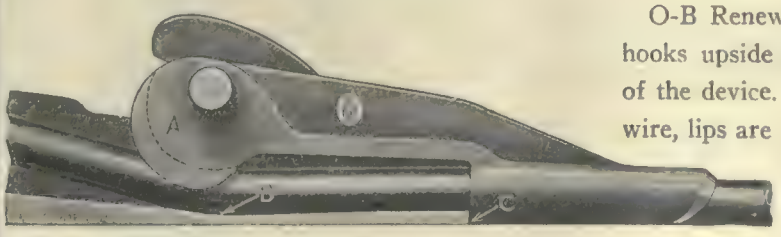
Speeding Up Maintenance Work

When it is necessary to replace a cross-over at a busy intersection every minute counts.

And O-B Type ER Cross-Over certainly goes up in a hurry.

Wires are laid in place, without cutting, compression block inserted and Cam Tips installed.

O-B Renewable Bronze Cam Tips are slipped under the hooks upside down with the outer end toward the center of the device. Then they are turned over and down on the wire, lips are clinched and the job is done.



O-B Cam Type (Pat.) Installed. End of Cross-Over Sectioned to Show Cam Action

O-B Type ER Live Rigid Cross-Over is made in 8°, 15°, 23°, 35° and 90° angles. There is a complete line of Cross-Overs rigid and adjustable, live and insulated, as well as Frogs, Section Insulators and Strain Plates, with O-B Cam Tips, described in catalog No. 16.

The Ohio Brass Co.

Mansfield, Ohio



In Paved Streets



On Open Track

Versatile Bonding Process

Whether subject to frequent traffic interruptions or none at all, whether in city streets or on the interurban, whether on a rebonding job or on new work, the installations of O-B Gas-Weld Bonds are easy and rapid.

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In paved streets it is only necessary to remove one or sometimes two bricks to install the O-B G.W. Bond.

And since the splice plate is not removed when the bond is installed it is particularly good for rebonding.

Its low resistance contact with the rail is permanent.

The outfit can be handled by any average workman and is quite inexpensive. It is useful for many repair jobs around the barns.

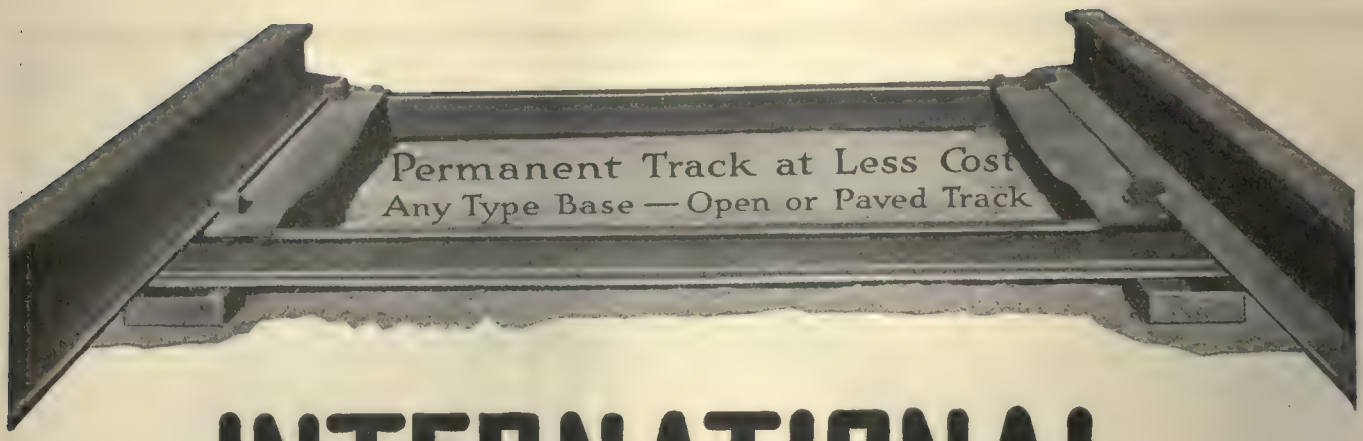
Shall we tell you more about O-B Gas-Weld Bonds?



On the Elevated

The Ohio Brass Co.

Mansfield, Ohio



INTERNATIONAL
STEEL TWIN TIES

Cut Your Labor Costs 50%

Here are the comparative figures

Labor Cost per Mile Wood Tie Construction A. E. R. E. A. Track Standard

1754 cu. yds. excavation @ $1.15	$2017.10
1494 cu. yds. concrete @ $1.00 (labor)	1494.00
Labor for laying ties and rails	2640.00
Total labor cost	$6151.10

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801 cu. yds. excavation @ $1.15	$921.15
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International Steel Ties Save 50 Per Cent in Labor Costs

Let us submit comparative estimates for your job

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Strong and Sturdy After 16 Years Service

Northern White Cedar Poles

Good for Many Years More

This shows lines of the Terre Haute, Indianapolis & Eastern Traction Co., Eastern Division; built of NORTHERN WHITE CEDAR POLES.

These NORTHERN WHITE CEDAR poles were set 16 years ago, have steadily carried good loads, and are good for years more of service.

Examinations made recently of NORTHERN WHITE CEDAR pole lines located in different sections of the country furnish plenty of proof of the long life of these poles. These examinations show that poles set from 15 to 20 years ago are in good condition —capable of years more of good service.

NORTHERN WHITE CEDAR POLES offer great resistance to decay. They contain a large percentage of heartwood, which adds strength. Low first cost and low cost per-mile-per-year. Light in weight. Easily transported and erected. Non-conductors and safe to work on.

NORTHERN WHITE CEDAR POLES are extensively used in large population centers where poles must carry heavy loads and at the same time be attractive in appearance. You are not dealing with theory and guess when you consider these poles. You have the record of years of service to guide you.

"The Sturdy, Attractive Line"

Northern White Cedar Association

Lumber Exchange **Minneapolis, Minn.**

The Farthest East of the New Haven Electrification is

Phono-Electric

the wire of long life



This view taken at Bent 1108 is between New Haven and Cedar Hill, the present eastern boundary of the New Haven electrification.

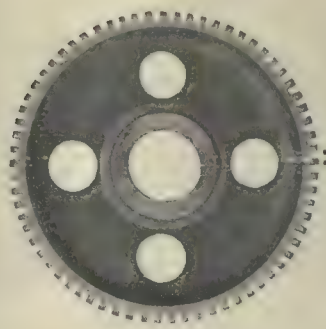
All the contact wire on this 3-mile terminal stretch is Phono-Electric—

The wire which the New Haven has found most desirable to attain the highest and most efficient standard of service reliability—spring and fall, summer and winter.

Are you fully acquainted with the value Phono-Electric Trolley Wire can have for you?

Bridgeport Brass Company, Bridgeport, Conn.





Nuttall Gearing

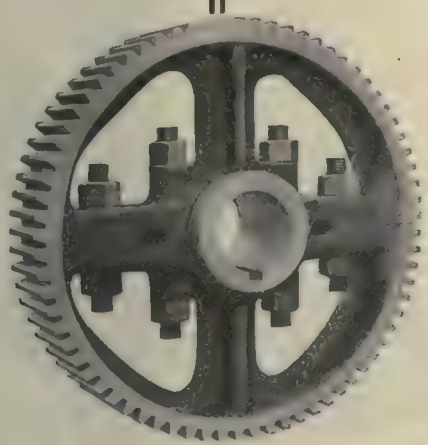
The Standard of High Quality

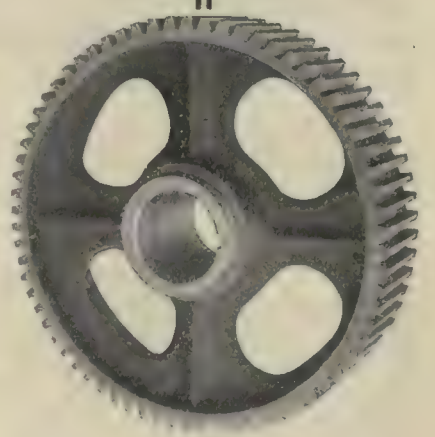
Less breakdowns, more mileage, and all-round better service result from using Nuttall Gearing.

B P treated forged steel gearing is recognized as the most economical under all conditions and demands your serious consideration. Forged gearing, in general, at the present time will cost less, offer better delivery and give the best of service.

Allow our engineers to recommend special gearing that will meet your exact conditions.

Write for special booklet.





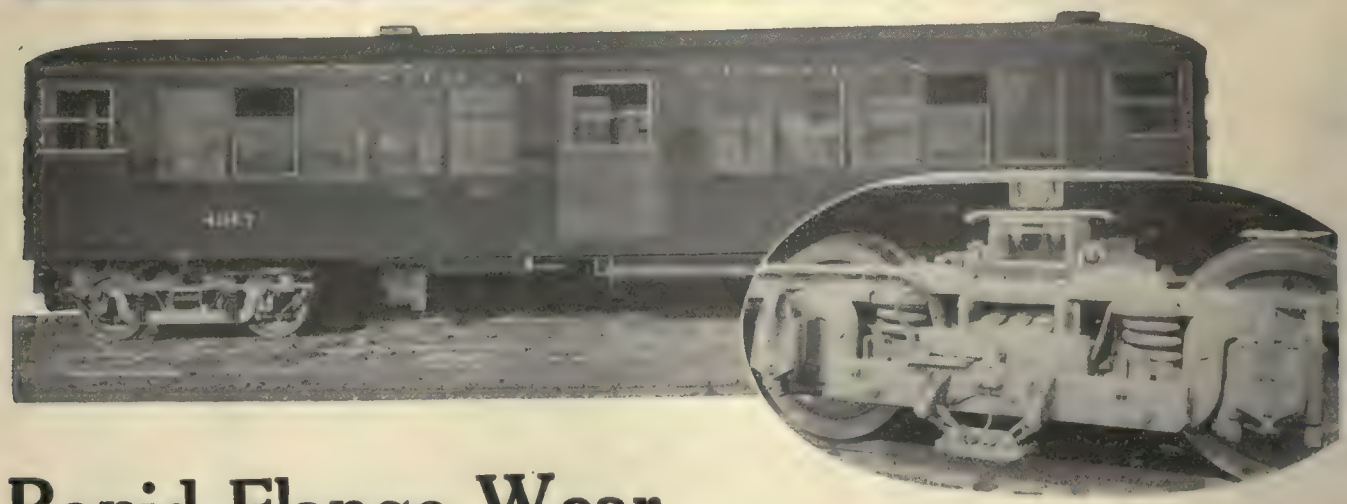
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Rapid Flange Wear is Caused by Binding Side Bearings

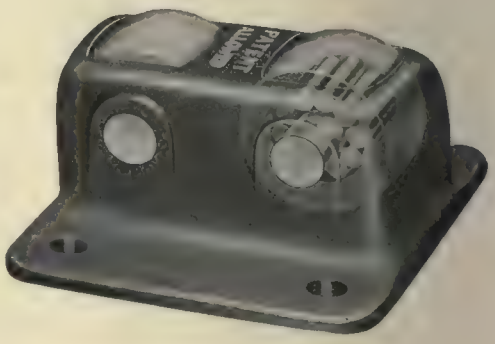
How many of your own cars are "down on their side bearings"? City cars sagging on one side, heavy interurbans pulled down by body weight, loaded freight and express cars.

Every time the trucks under these cars tend to turn on curves or switches the side bearings bind, wheels grind and screech and rails wear. Ordinary friction side bearings are the most inefficient and wasteful parts of your cars.

Friction side bearings cause excessive flange and rail wear, broken flanges, derailments due to wheels which climb when side bearings bind. They resist the turning of trucks and thereby waste power on curves.

Proper anti-friction side bearings eliminate this binding and allow the wheels to easily follow the rails, decreasing wear on both and reducing the number of broken flanges and derailments.

Perry anti-friction side bearings are the only side bearings which are truly anti-friction all of the time. They roll on small inner rollers, are not lubricated and do not freeze or stick. Over 200,000 are in use and you run no risk of mistake in specifying for new or putting on old cars. They cost little more than friction plates.



Put Them On Your *Old* Cars

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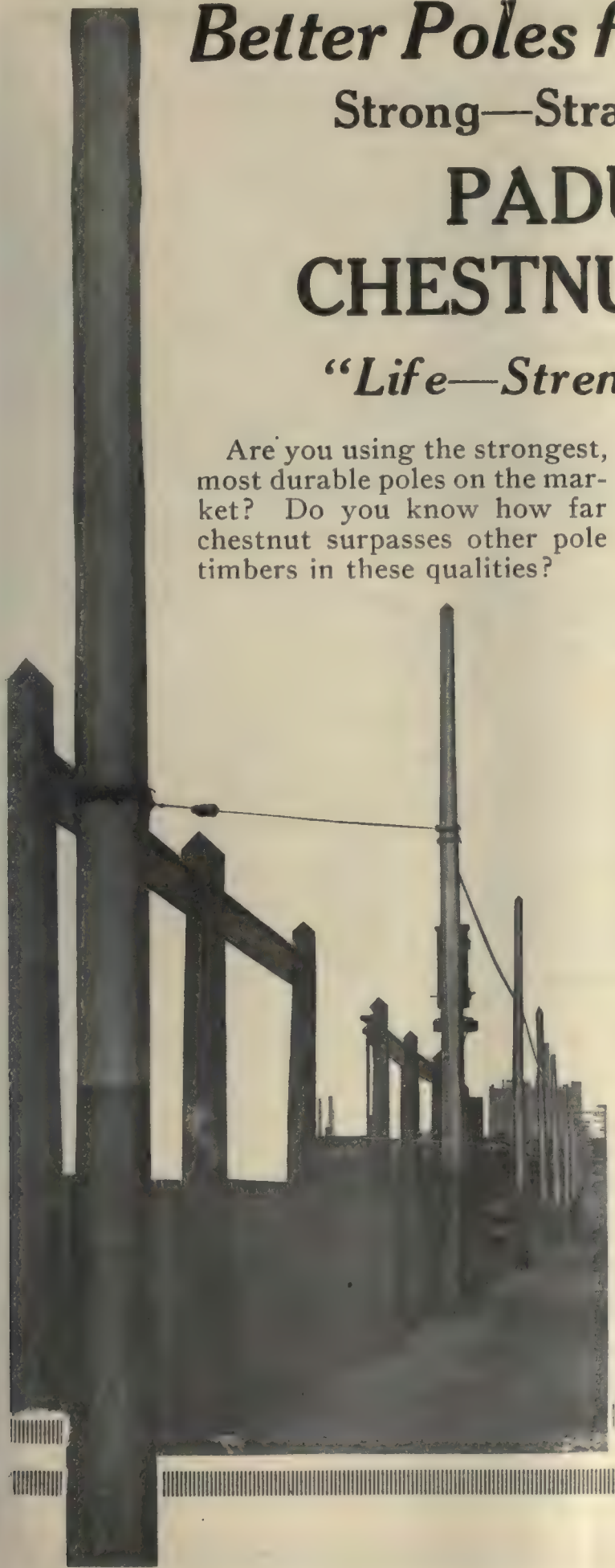
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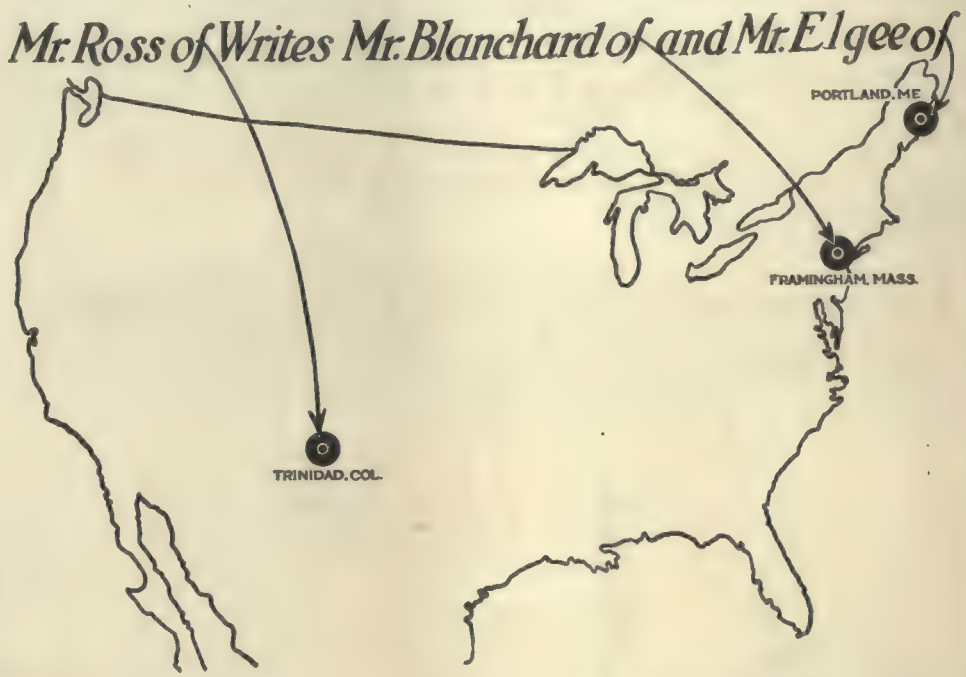
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My dear Mr. Elgee: . . . I am very glad to have had the opportunity of reading your article, and I believe that if all railway men of broad experience like yourself would from time to time write short articles, such as yours, for publication, it would be of great benefit to all concerned in the railway industry and go a long way toward reducing the operating costs on those properties which are so unfortunate as to be maintaining old types of equipment.

THE TRINIDAD ELEC. TRANSMISSION,
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(Signed) Geo. H. Ross, Jr.,
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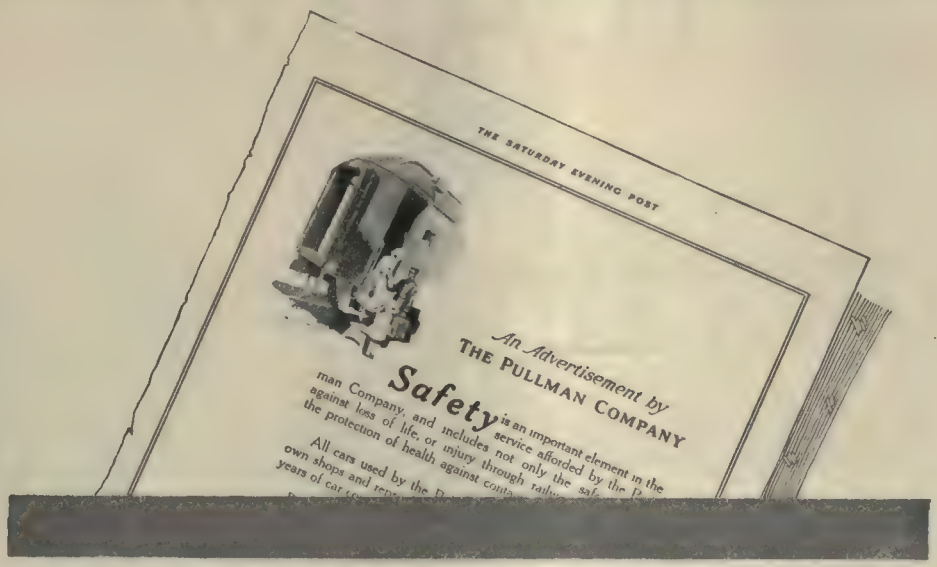
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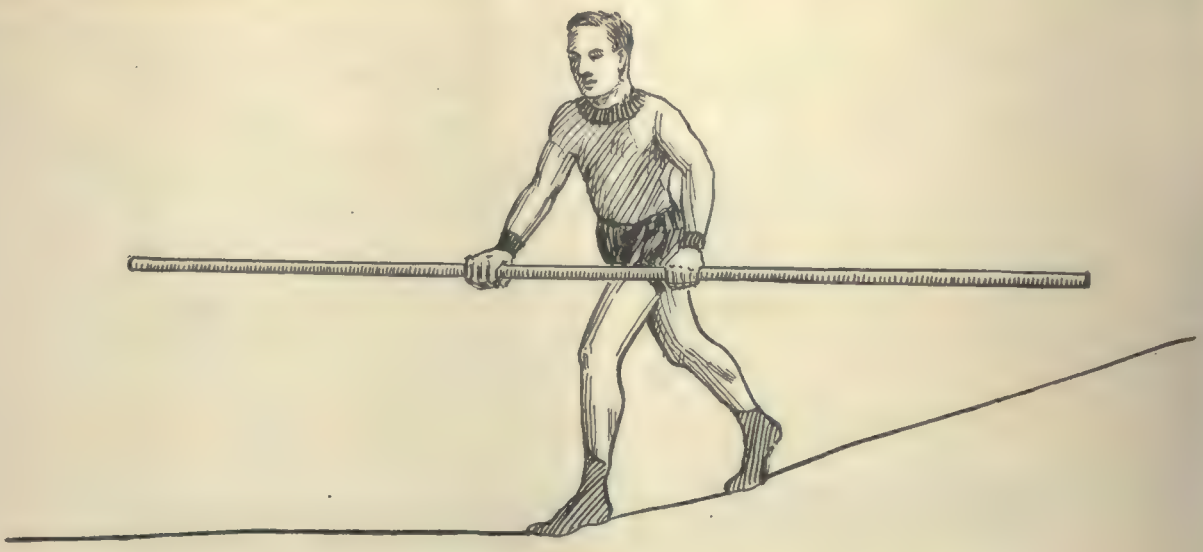
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Electric Railway Journal

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STRAWS SHOW THE DIRECTION OF THE WIND

The news pages of this paper are a pretty good barometer of the activity along different lines of electric railway endeavor. A striking feature of these columns recently, especially in the department of Traffic and Transportation, has been the number of important steps taken by railway companies to improve public relations. In several cases it has been the appointment of publicity agents, in others it has been the advertising for suggestions for needed improvements in the service, in still others the establishment of employees' magazines, or of schools for instructing the men in courtesy, or of other means for allaying public criticism. More and more is there in evidence a recognition of the necessity of better public relations, not as a means for obtaining privileges from the public as compensation, but because such a policy is part of the duty of every public utility. The increasing amount of attention being given to this subject is naturally gratifying to us as we have been consistent advocates of such a policy for years.

THE FUNDAMENTAL MOTIVE

The fundamental motive of all successful campaigns toward better public relations must be that the public is entitled to good service and fair treatment. It may be that the company considers that it is not receiving fair treatment from the public, but this is no excuse for a neglect of its own duties. Let the company carry out its part of its written and unwritten bargain to supply good service, and if the public recognizes that this is being done we believe that it will reciprocate with fair treatment to the utility. Concrete instances often point a more easily understood moral than general statements, and several such are mentioned in this week's issue. One of these relates to the city of Buffalo. Here a complaint by a certain newspaper that good service was not being given was answered by a general request to the public for any constructive criticism on the transportation furnished. The daily paper could do nothing but make its criticism concrete, and submitted twelve ways in which it suggested improvements might be made. The company promptly issued a statement entitled "How We Meet Criticism." In this it acknowledged that some of the points were well founded and explained the physical conditions which had prevented their earlier correction. It then agreed to make such changes as were immediately practicable, promised to introduce such others as could be carried out and, where actual opportunities for improvement were beyond the power of the company, presented an explanation of the reasons therefor. Such a policy cannot but have its effect. Still other instances of the way in which proper publicity can make the position of a public utility clear to the public are given in a contributed article, also in this issue.

USELESS REPAIRS TO STREET PAVING

A trip over a large city property recently disclosed the surprising fact that repairs to pavement were being made at points where battered rail joints had destroyed the surface but that no attention was being paid to the joints causing the trouble. Presumably no recognition had been given to the hopelessness of maintaining pavement adjacent to loose joints, whose working in a vertical plane is generally sufficient to displace even the most rugged class of surfacing for streets. The cause of such bad spots ought to be obvious enough, especially when it is not uncommon to find that, when all of the joints in a stretch of track are weak, the paving surface is badly broken up at regular intervals along the rail, each disturbed area having a radius of a few feet that centers exactly on the joint. The remedy ought to be equally obvious—the repair of the joint. Certainly it cannot be that repairs to paving at such points are anything more than patch work, and patch work of such a kind invariably means wasted money. Since the primary cause of the trouble has not been removed, there can be no doubt that the repaired pavement will promptly return to its original condition and that the expense for labor devoted to relaying the pavement, even though this might be small in amount, could far better have been applied to the renewal of a few of the worst track joints.

LOCOMOTIVES IN SUBURBAN SERVICE

The probable purchase, in the near future, of locomotives rather than multiple-unit equipments for the New Haven's suburban service brings up a phase of the locomotive versus motor car problem that is worth consideration. This is that when locomotives are used to haul suburban trains during the morning and evening peaks, the same motive power may be used for through trains of passenger coaches during the rest of the day (provided the schedule may be so arranged as to permit it) and thus the service factor of the costly electrical equipment may be raised. Normally, of course, the motor car is considered preferable for this class of traffic because it is not unusual for suburban equipments to make only one round trip each day owing to the limited duration of the peak loads, and because a train of multiple-unit cars costs less than a train of

trailers with a locomotive, first cost being, of course, of greatest importance where such low service factors exist. If, however, sufficient freight, or through-passenger traffic that cannot be handled in motor cars, exists during the hours when suburban traffic is at a standstill, it is easily conceivable that the locomotive may furnish the more economical, or less expensive, type of motive power.

SOMETHING TO TALK ABOUT

The paper on the training of motormen for the Chicago Elevated System, published elsewhere in this issue, sets forth the long and thorough training to which all motormen on the system are subject before being intrusted with the responsibility of train operation. This training is an extremely important matter on the elevated roads in view of the disastrous results which might follow dependence on careless or irresponsible motormen. The splendid record of the Chicago system reflects the wisdom of this long-term student period, and the company's patrons must feel a sense of safety in the knowledge that such competency is required of the men in whose hands their lives are daily intrusted. But do the people know about it? Isn't such activity on the part of the transportation companies to safeguard their passengers—not only in Chicago but elsewhere—of popular interest? The fact is that it is just this sort of thing that makes a good "human interest" story, although it is only one of the many phases of electric railway operation in which the companies profit by a better knowledge of their work on the part of the public.

SPECIFICATIONS FOR MEN!

Why not? Time and again experience has shown that when material not up to specifications is used in a machine or structure costly accidents happen, early replacements are required, and in the end the final cost is as great or greater and the final results less satisfactory than as if good material had been used in the first place. The organization of men necessary to operate a railway can be likened to a machine, and from the very nature of its structure and functions it is necessarily a delicate machine. For satisfactory operation the parts must be well balanced and carefully co-ordinated. The better the individual units which compose the machine conform to a properly specified ideal, the better will be their team work or co-ordination. The elimination of the physically unfit, the mentally incapacitated and the careless reduces the number of accidents and makes for better service. The elimination of the faultfinder, the grumbler and the restless type of individual decreases the strike hazards and promotes good public relations.

A purchaser usually feels that he can afford to pay higher prices for material that conforms to specifications than for material which does not. The same thing might indeed apply to labor. A part of the savings in accident claims, strike losses and replacement costs might well be paid out as wages to competent employees who, by good and faithful service, have made such savings possible. The higher rates of pay thus afforded would attract a higher and more stable class of men to the service.

We recognize that the caliber of a man cannot be calipered, and that when labor is as scarce as it is at present employment officials are glad to be able to find material of any kind. It seems to us, however, that the present tendency, as evidenced by a number of papers and discussions at recent association meetings, to exercise great care in the selection of recruits for the operating department is a far step in advance of the older and more haphazard methods.

HANDLING WAY MATERIALS

That way engineers are alive to the possibilities of saving money by judicious use of mechanical devices is clear enough from the number and tone of the articles which this paper has been printing recently. The fact is that there is no more prolific topic of conversation around the way department of any railway. In this issue there are four articles on the subject, all prepared with the idea of showing for the benefit of the industry in general the results which have been obtained by applying certain definite and fundamental principles on particular properties.

We hope that before this discussion is closed there will be at the disposal of managers and way engineers all of the information which they will need in answering these questions while solving problems in materials handling or planning to perform a given special or routine operation: (1) What is the general practice on a job of this sort? (2) What apparatus is available for performing it? (3) Among available devices which is most economical for this case? (4) What savings are to be obtained by using the best available equipment? (5) Shall we purchase this equipment or build it or some makeshift for it ourselves?

So much for the particular job, but there is another angle from which the subject can be viewed, as suggested by such questions as these: (1) What devices are way departments finding useful generally? (2) Could any of these be used profitably on this property with our present organization? (3) If not, could the organization be modified so as to permit the use of such devices? and so on.

Some of the principles referred to in the first paragraph stick out prominently in this discussion. First, there is no question as to the expensiveness of human labor considered merely as mechanical work. Man-energy costs at least $2 per kilowatt-hour. But some investment in machinery is necessary if cheaper energy is to be utilized, and the economy of this machinery depends upon the number of hours per year during which it can be used. Power plant engineers use the term "load factor" in a somewhat analogous connection. The term "service factor," as used on the preceding page in a discussion on rolling stock is quite applicable to machines used by the way department. The second principle, then, is that machines must be

kept busy if they are to be profitable. There are, of course, some instances when the possible savings are so great that a machine will pay for itself in a short time. In the run of cases, however, sensational savings are not to be expected and the general principles of economics apply.

The securing of high service factor implies adaptability. Hence we note the popularity of the mobile crane car or derrick car which can perform many functions, as is splendidly illustrated elsewhere in this issue. There is here, then, a third principle, namely, that in general the equipment which is most adaptable to a wide variety of uses is likely to prove most economical.

The present discussion started with the storage yard. It could not be confined there, and has broadened out to include labor-saving devices in all divisions of the way department. While the way department engineers "have the floor" they had better bring out all the available data. Later they must yield their place to other departments that are of equal importance in the operation of electric railways.

PREVENTING RAILWAY STRIKES

Out of the maze of discussion during recent months on the subject of strike prevention, there has at last appeared from an official source a proposition that should be carefully studied by electric railway officials. We refer to the labor plan, published in full on another page, of the Public Service Commission for the First District of New York. Confronted last August and September with the threat of an unparalleled tie-up of electric railway transportation in the metropolitan district, this commission has made a careful investigation into what it deems the defects of the existing public service law, and has now presented for constructive criticism a tentative statement of its recommendation for legislation.

The advantages which the commission itself asserts for the plan would seem to indicate that an earnest endeavor was made to consider the rights of all parties concerned—the railways, the employees and the public. For example, fair wages and working conditions would be determined by the companies and their employees, under the eye of an impartial and non-voting appointee of the commission, or by a wage board organized by the commission and composed half and half of company and employee representatives, or else by the commission itself. All questions of wage-fixing, etc., not settled by mutual consent would be referred to a wage board, but it is provided that applications to such a body should not be made until reasonable opportunity had been given for the companies and employees to reach a mutual understanding, the wage board or the commission being the judge of the reasonableness of such opportunity. The final approval of the settlement by any method would rest with the commission. The plan thus seems to allow a wide and fair latitude for the private settling of industrial disputes upon the basis of facts instead of coercion, commission supervision being reserved only to protect the rights of the public. In connection with wage increases it is supposed, of course, that the right of railway owners to a fair return would be preserved.

The questions of unionization and discipline appear to have been handled in a liberal manner. In the first instance it is provided that ten or more employees might form an association or union or branch of any such existing body, and that all such organizations (together with the unorganized men) would share in the membership of the wage board in a reasonably proportionate way, provided every six months they filed with the commission their rules, officer and membership lists, and a written consent to abide by all awards. The plan thus allows freedom of organization and collective bargaining, but it assures to any internal brotherhood and all unorganized employees an appropriate participation in wage and other adjustments. In regard to discipline, this would primarily be left, as it should be, in the hands of the employer, deserved redress, however, being obtainable on review from the wage board or commission.

From the point of view of the public, the most important part of the plan is the limitation on the right to strike. Not only does the idea of enlistment for public service find approval in the provision for an express or implied contract of service for one year (terminable upon thirty days' notice), but the right of the public to uninterrupted service is further recognized by the prohibition of strikes pending wage and other determinations. After the findings the employees would supposedly be bound both by their contracts of service and by their registered pledge of obedience to any award made. How to enforce such provisions is, of course, the crux of the problem. The plan provides that any violation would be classed as a misdemeanor punishable by a fine. Before such a punitive clause is adopted, however, the commission would do well to ascertain, if possible, how effective it would be in the case of the average employee. Might it not be desirable that all union organizations parties to such an agreement be required to file a bond, so that a better hold would be had on them for damages?

It is evident that the proposal in its fundamentals is designed to assert the public right only with a full recognition of the public obligation to both employers and employees. According to newspaper reports, however, the leaders of organized labor have been quick to denounce the plan, a move not unexpected in view of their general opposition to any system that will take from them their chief duty of fomenting strikes. Yet we believe that the public is becoming more deeply conscious of its right to continuous service, and the plan of the New York commission is a fair sign of the times. For this reason it behooves electric railways not only in New York City but throughout the country to examine the proposal carefully for unjust or impracticable provisions. The approaching hearings in New York will be on a subject of vital importance to the future prosperity of the industry, and every possible constructive and helpful suggestion is needed.



HANDLING WAY MATERIALS—STORAGE YARD CONGESTION DUE TO FAULTY USE OF EQUIPMENT

Handling Way Materials Economically

Practice of Kansas City Railways and General Principles Involved in Cutting Cost of Handling and Transferring Material

By A. E. HARVEY

Engineer Maintenance of Way, Kansas City (Mo.) Railways

THE cutting of cost in the handling of material in storage yards is an exceedingly important process. There are many points involved which, unless carefully considered, may be overlooked by the uninitiated in an attempt to cover them, and may cause unnecessary expense.

The most important point to consider in this connection is the keeping of the equipment which may be required for the work in proper balance with the amount of work to be performed. In other words, large sums of money should not be expended in the purchase of expensive machinery which may be used only a few days in the year. The interest, depreciation and upkeep of machinery of this kind will frequently amount to much more than the increased cost of handling material by other methods. Again, in the purchasing of machinery for purposes of this kind the selection of equipment that can be used for only one particular purpose and in one location should be avoided as far as possible. Machinery standing idle earns nothing, and the most economical results will be obtained in using machines that can be utilized for many purposes and kept constantly at work.

Material Should Be Handled as Little as Possible

A third point, which in the estimation of the writer is more important than either of the others, and one which more than any other is overlooked by engineers, is the proper timing of the receipt of material for storage. The most economical proposition is that all material received should be transferred directly from the steam railroad cars to the cars of the traction company and delivered immediately upon the work, thus avoiding one handling.

The way in which this principle is applied in the handling of cement on the Kansas City properties is as follows: We used last year a total of 440,800 sacks of cement. Our storage capacity would take care of two cars only. The cement house was kept as full as practicable, but all orders were filled directly from cars. Seldom was cement transferred from the cars to the house, except where there was a small portion of a carload left at the end of a day's work which could be transferred to the house and thus release the car. Occasionally cement was taken from the house to fill the orders when for any cause there was a delay of a day or two in the receipt of material, but it was found that the amount of storage provided was ample to cover such emergencies. The net gain during the year on account of not having to rehandle this material would amount to about $2,000.

Co-operation with the Purchasing Department Is Necessary

This ideal condition, of course, cannot be made to apply in all cases, but should be approached as closely as possible. This proposition necessitates close co-operation with the purchasing department. It involves the ordering of material at the proper time, governed largely by expected or possible delivery, and the careful following of such orders to see that the material is delivered at a certain time, so as to correspond to the progress of the construction work. Of course, the statement may be made that in these days it is impossible to specify and govern the actual delivery of material of almost any kind, on account of manufacturing and transportation conditions. But one can do the other thing, namely, regulate the work to conform to the delivery. Under this method, the store yard should act only as a reservoir to carry a sufficient amount of any commodity to tide over a break in the regular delivery, and take up a portion of the deliveries which may be made in advance of the requirements. The distinct advantage of this method of handling the store yard is not only in the saving of extra handling of the material made necessary by storage, but the space required for storage is decreased and money invested in stores is materially decreased.

In track work these matters, of course, can apply most generally to such materials as granite block, brick, stone, sand, drain tile and cement. Upon metals, where the deliveries are dependent upon manufacturing conditions at the mills, such as the time at which certain



HANDLING WAY MATERIALS—USEFUL DERRICK CAR ON KANSAS CITY RAILWAYS

rollings of rail are to be made, the time cannot be so closely gaged, and it is frequently necessary to store a considerable amount of materials of that class.

DIRECT TRANSFER OF MATERIALS TO JOB ECONOMICAL

In Kansas City this policy in the handling of supplies has been followed partly through necessity on account of the limited storage capacity of the yards. There has been no material delay to any work on account of failure to receive standard material, however, and it is safe to say that in the past year 80 per cent of the granite block received has been handled and delivered by direct transfer to motor cars. More than 90 per cent of the brick received, 95 per cent of the cement, 80 per cent to 90 per cent of the sand, and all of the crushed stone have been handled in this way.

Taking these items in the volume used in Kansas City last year, the saving to the company in direct handling of this material amounted to $3,200 or more. The total actual saving may have been double this amount, for when material is unloaded from railway cars for storage more than the passing of material a short distance from car to car is involved. It must be moved back a sufficient distance from the track to provide proper storage space, and this distance has again to be covered in the reloading.

When one stops to consider that this procedure results in a saving of one handling of all material involved in the construction and reconstruction of 10 to 15 miles of track in this case, he must concede that it is a more important item in cutting down materials-handling costs than the difference in the cost of handling a comparatively small amount of material with expensive machinery instead of manual labor. The management of a store yard by such methods and under such conditions does not mean that it is not economical to use modern equipment in handling material wherever practicable. Care should, however, be taken in the selection of such equipment, and first cost, operating and maintenance cost should be carefully balanced with the requirements.

MACHINERY CAN BE USED EFFECTIVELY ALSO

The machine best adapted to the handling of material in the store yard of a street railway, and one which can be put to the most universal use, in some form of hoisting machine that can be used in any part of the yard. Such a machine is perfectly practicable, as the heaviest material which it must handle will be a large piece of special work, or crossings, or perhaps a clam shell for use with stone or sand. It has distinct advantages over fixed derricks on account of its large radius of action. It should be so constructed that it may be utilized upon the main tracks, in which case it will earn far more



HANDLING WAY MATERIALS—SIMPLE DEVICE FOR THE RAIL PILE; STIFF-LEG DERRICK MADE FROM BRIDGE MEMBERS

money than any fixed derrick. It can be utilized 100 per cent of the time in earning money for the company, whereas a derrick for the handling of sand, special work, or miscellaneous material of any kind can be utilized only for the material that lies within the radius of its arm, and will probably stand idle more than 95 per cent of the time.

An accompanying illustration shows a derrick car that has given excellent service in Kansas City. The days and nights are not long enough for this machine to accomplish all the work that might be assigned to it. It can be used anywhere in the yard, in transferring and unloading material in the streets, in placing special work, in picking up scrap or other material, in picking up and transporting machines and in doing a thousand other things incidental to track construction.

If, however, there is sufficient work to keep a machine busy continually within the confines of the store yard, it would be better to use a slightly different type of machine, such as a locomotive crane. A machine like this, of less speed, carrying a longer boom and having a greater lifting capacity, is usable in any part of the yard. At the same time it has all the advantages that could be derived from a boom derrick.

An Effective Device for Handling Rail

The handling of rail in the yard is in itself a difficult and expensive job, ordinarily involving the use of a large gang of men. In this work the sliding, pulling and dropping of rail, with the tendency to kink or break it, should be guarded against. Rail cannot safely and to advantage be handled with a boom derrick or with a crane car. It is a material that ordinarily must be received and stored at such time as it can be secured, and a permanent arrangement for handling it is frequently justified.

Another illustration is shown of an arrangement that has proved exceedingly satisfactory and economical. It consists only of two uprights, 12 in. x 12 in., properly braced, between which an I-beam 50 ft. long is suspended. The beam is fastened with a pin at one end and it is hinged at the other. When in use the I-beam is swung across the rail pile and the car of rail and is secured by means of the pin. Rail is lifted from the car and transferred to the pile, or vice versa, by the use of a differential pulley. This can be done with a force of not more than five men. The cost of transferring is 7.3 cents per ton, as compared with the 53 cents per ton which was the cost when the rail was dragged out of the car and skidded up onto the pile. This device also gives us a more economical pile as the rail can be carried higher and the amount of required storage room is thus reduced.

This form of derrick is, of course, fixed and limited in its use and is necessarily in service but a small percentage of the time. It is, however, an economical device on account of its low first cost and the low cost of maintenance and operation. Its use is justified where a derrick costing $5,000 or $6,000, for the same service and where used only for such service, would be barred on account of its first cost and the cost of maintenance.

The Use of Derricks

In the handling of such commodities as sand and stone there is undoubtedly a vast advantage in the use of machinery. For this purpose we have made good use of a stiff-leg derrick built up of second-hand bridge members and operated by means of an electric hoist. A photograph of this is shown herewith. The volume of material handled at this place in sand and stone amply justifies the use of a fixed piece of equipment. A large storage capacity is supplied within the radius of a boom, but a very large percentage of material may at the same time be transferred directly from the railroad cars to the motor cars of the company. The cost of transferring sand or stone or its reloading with this equipment amounts to 1 cent per cubic yard for sand and 2 cents per cubic yard for stone.

This is an illustration of the proper use of equipment of this kind where the material handled is of but one or two classes. An improper use of equipment of this kind is shown at the top of page 150. Here the derrick is seen in use in handling and storing special work and material of that class. The congestion that occurs within the range of this boom is conspicuous in this picture. Frequently material that might be required first was stored at the bottom of the pile. This derrick has been replaced with a crane car, which has resulted in more methodical and economical storage.

Summary and Conclusions

While the use of modern equipment is beyond question economical, it should be reiterated that a grave mistake may be made in the selection of equipment and the investment of large sums which will be earning for the company but a very small percentage of their time. These, as has been pointed out, are expensive in maintenance and depreciation, and in some cases in operation, requiring special men with them at all times. Therefore, in the selection of equipment for use in the yards, that which can be most generally used should be chosen. A machine may be a mechanical wonder, but if usable only from 5 per cent to 10 per cent of the time it is economical only during that time.

The arrangement of tracks, also has a very important bearing on cutting costs in material yards. In fact, the trackage arrangement is the basis upon which the entire scheme for handling material should be built. It should be such that, whatever facilities there are for the handling of material, the material can be transferred directly from the original cargo to the motor cars, or into storage, without the necessity for moving cars. The arrangement should also provide for convenient handling from storage to the motor cars. A first-class track arrangement, laid out in accordance with this principle, supplemented by the use of a locomotive crane, and with such fixed hoisting arrangements or derricks as conditions may justify, will provide a yard where material may be handled and transferred in the most economical manner.

Bulletin on Troop Transportation

The gigantic task of transporting troops to the border during the mobilization in June and July, 1916, is described in a bulletin issued by the American Railway Association, New York, which contains extracts from the recently published report of the Quartermaster-General of the United States Army. To move the first 100,000 guardsmen to the border, the railroads furnished 350 trains made up of 4900 locomotives, 3000 passenger cars, 2000 stock cars, 1300 box cars, 800 flat cars and 400 baggage cars, rolling stock which, if combined in a single train, would have been 90 miles long. Troops were carried from 608 to 2916 miles, distances greater than on any European war front, with only one accident, and that a slight one.

The National Safety Council announces that the proceedings of the Detroit meeting, which were covered in abstract in the issue of the Electric Railway Journal for Oct. 28, 1916, page 930, are ready for distribution. Members can secure at a nominal cost reprints of the electric railway and other section proceedings for distribution to employees.

Practical Results in Publicity Campaigns

Circumventing the Misguided or Unscrupulous "Reformer"

By CHARLES T. HEASLIP
New York City

[*Two instances are cited. In one the president of a gas company received his inspiration from the readiness with which his story was understood by a friend at his club. The same statement of facts was given to the public and the municipal ownership advocate lost his following. In the second the representatives of the company "took the stump" to neutralize the oratory of a political spellbinder.*]

TWO years ago a sincere but radical reformer attacked the validity of the franchise of a company that supplied gas for light, heat and power purposes in a small but rapidly growing city. The attack came at a time especially inopportune for the company, as its officials were trying to borrow money for extension work absolutely necessary to keep the company's service abreast of the growth of the community. With the franchise under fire, however, it was impossible to negotiate the needed loan, as capital always fights shy of a company whose franchise rights are being questioned.

Now the franchise had been granted in the old days, before it was the custom to limit such grants to a period of twenty or thirty years, and the company claimed that it was perpetual. But in order to halt the attack being made upon it, and incidentally to avoid expensive litigation, the company offered to waive that claim if the city would grant it a new and more modern franchise. Accompanying this offer the company submitted a draft of the kind of franchise which it would accept. This provided for generous discounts to consumers and for a revision of rates at five-year intervals.

Under ordinary circumstances the city officials would probably have accepted the company's offer, as the suggested franchise was both fair and modern. Moreover, the company itself had an exceptionally clean record in the community. But its reformer foe was rapidly blackening its reputation. As stated before, the reformer was sincere, but a radical; and illustrating that the first essential to being a radical is to eliminate all sense of fairness from one's system, he had raised the cry of "Stop Thief!" against the company.

Originally this cry had been based upon his assumption that the company's old franchise was invalid and that it was stealing rights from the city for which it should pay, but even the company's offer to buy a new franchise did not induce him to withdraw his charges. The proposed measure, despite its discount provisions, did not provide for rates which, in his estimation, were sufficiently low. Therefore, the company was still a thief; the city should take over the plant and conduct its own gas business. As a result of this tirade the city officials, most of whom were up for re-election, were afraid to consider the company's offer until they could see just how seriously the public was going to regard the reformer's charges.

While the matter was hanging fire the president of the gas company chanced to meet the president of the local Civic League one afternoon at the Elks' Club. Conversation turned to the subject of the franchise, and within five minutes the Civic League man was listening with interest to the public utility official's presentation of the company's case.

When the latter had finished the Civic League man said to him:

"Harry, I wish you'd attend the next meeting of our league and tell the members the same story you've told me. We've been thinking of endorsing the municipal ownership movement started by Harris (the reformer), but before any vote is taken on the matter I want the league thoroughly to understand the company's position I think it would make a difference."

The president of the gas company accepted the invitation and on his way home that afternoon he did some hard thinking. He was a conservative man, and not in the habit of discussing company affairs outside his office; but his chat with the head of the Civic League had been an eye-opener. The Civic League executive was a social economist with ideas on the rights of corporations that differed materially from those of the corporation man. Yet they had been able to meet amicably in a club and discuss the gas company's case with perfect intellectual honesty and without calling each other names. On the one hand one man did not think that the other represented predatory wealth, and on the other hand the second man did not think that his companion represented predatory poverty. Moreover, at the conclusion of their chat the Civic League man had shown that he was not only interested in the public utility man's view on the rights of the gas company, but that he stood ready to respect them.

As the president of the gas company pondered this fact it suddenly dawned upon him that he had been able to accomplish what he had, not because men are more logical, tolerant or amiable in a club than on the street, but because he had trusted his one-man audience and had stated the gas company's case implicitly. And in doing so, he had made it vital, human and interesting.

"If I can do that with one man," he soliloquized, "I ought to be able to do it with the whole town."

Following out this line of reasoning, he engaged the services of a publicity man and told him the same story that had won for him the interest and respect of the head of the Civic League.

"Your job," he said to the publicity man, "is to get that story before the public in the most effective way possible. Do it any way that's legitimate, but get it over!"

In carrying out these instructions the publicity man gave his employer a job by arranging for him a personal speech-making campaign which took him before every club and civic organization in the town. Arrangements were made with the newspapers to give this "stumping tour" all the free advertising that its legitimate news features warranted.

Then, with public attention focused on the gas company, the publicity man supplemented the speech-making campaign of the president with a series of "Franchise Talks" in the advertising columns of the newspapers. These occupied a quarter page in each paper daily, and told the company's story in chapter form, each chapter setting forth an individual phase of the company's case. They were written in a frank, friendly, man-to-man tone and the public read them, partly because they were interesting and visualized the efforts which the company was making to earn a square deal from the community,

and partly because the public is always ready to hear the other side of any controversy.

As this combination campaign progressed the city officials began to receive resolutions from the clubs and organizations before which the president had spoken, urging them to accept the company's offer. Gradually these communications increased in volume. Then came letters from individual citizens to the newspapers, supporting the company's cause, letters from business men urging the people to show by their attitude on the franchise that they belonged to a fair-minded community and were not prejudiced against capital merely because it was being attacked by a politician or reformer.

To make a long story short, the municipal ownership agitation, which had in the beginning threatened to become a real menace to the company, gradually subsided; the city officials accepted the offer made by the company, and within a period of two months the new franchise was granted.

Two significant deductions can be drawn from this incident. One is that if a public utility official will trust the public as he trusts an individual friend or acquaintance, it will not take him long to secure a degree of understanding between his corporation and the public that is of tremendous value in times of stress. The other is that it is possible for a corporation with an honest theory of its own existence and conduct to secure fair play from the public even when a reformer or politician has raised the cry of "Stop, Thief!" against it—providing, of course, that the company uses intelligent methods.

The question may now arise as to what constitutes "intelligent methods" for a company that is under fire. Does it always mean advertising plus speechmaking on the part of the company's chief executive, or are there other ways of convincing the public that a corporation is not necessarily a thief just because a reformer or politician sees fit to tack that appellation to it?

It has been the experience of the writer that the answers to the above questions depend largely upon local conditions. One fact which stands out, however, is that the company under fire should waste no time in getting its case before the public.

This has been proved again and again during the past few years by the failure of eleventh-hour truth-telling campaigns on behalf of companies that have failed to see the handwriting on the wall and have let the politicians get ahead of them.

For the companies whose officials are ever on the alert, however, the task of checking an anti-corporation agitation that threatens to become dangerous is not impossible, pessimists to the contrary. A frank "public-be-told" campaign in the newspapers can nearly always be made to produce effective results, but its benefits may be materially increased if the company officials will supplement their "straight story" in the press by every other legitimate method of gaining an audience that opportunity affords.

A Politician Discomfited

I remember, for instance, a campaign which I helped a Southern lighting company to conduct against a typical political demagogue who was a candidate for a place on the board of aldermen on an anti-corporation platform. He had selected the lighting company as a stepping stone to office because its franchise expired the following year and the new one proposed was to be the subject of a referendum vote of the people.

Under the proposed franchise the domestic service charge for electricity was to remain at the same figure which the company was charging—10 cents per kilowatt-hour. In a river town fifty miles away, where coal was cheaper and the expense of manufacturing current was less, the domestic service charge was only six cents per kilowatt-hour. Seizing this chance to draw the "deadly parallel," the politician made his campaign upon pledges of "six-cent electricity for our town."

When I arrived on the ground the company had already started to present its case to the public through a series of newspaper advertisements, but a preliminary canvass taken in the mill district of the town showed that the company's political foe was making more converts there than the company. An investigation by one of the company officials and myself showed that, like a number of anti-corporation candidates, he was a great believer in the doctrine of rant. He ranted about the tyranny of capital in general and that of the local lighting company in particular. He almost wept when he told his "dear brothers" how they were paying four cents a kilowatt-hour more for their electricity than was "justified," and how that four cents, which "multiplied itself into thousands of dollars during the course of the year," all went into the "capacious pockets of the greedy lighting corporation."

At that stage of his speech an illuminating incident occurred. One of his listeners, a quiet-looking man with shrewd gray eyes, made so bold as to heckle him.

"Look here, friend," he said, "what do you mean by this here kilowatt thing?"

The question startled the candidate and he sparred for time.

"So you want to know what a kilowatt is, eh?"

"I surely do," affirmed the heckler.

An inspiration came to the candidate and he grabbed it.

"A kilowatt, my friend," he said, "Hell—a kilowatt is something this robber company is charging you 10 cents for when you ought to be getting it for 6!"

The answer raised a laugh and the speaker took advantage of it to hurry on to less dangerous ground. But a brief survey of the audience tended to indicate that he had underestimated the mentality of some of his listeners. Both the company official and myself were convinced that there was an excellent chance for the company to discount the vituperative arguments of the candidate with a personal campaign of honest explanation and reasoning. The upshot was that we decided to follow the candidate with a corps of clever and good-humored spellbinders who would speak at each place after him and riddle his accusations against the company with simple and specific explanations of the points raised against it.

In carrying out this idea we kept one man with our political foeman on all of his speechmaking tours. This man reported the candidate's speeches to our spellbinders and also gave them valuable information as to the character of the audiences which they would face in each place and the probable questions which would be hurled at them. The company induced two of its best solicitors, who were popular chaps and good "mixers," to take the stump for the franchise, and they succeeded in securing fair play for the company all through the candidate's district. As a result, the company not only secured a favorable vote on the measure, but its political opponent was defeated on the very platform on which he had expected to win.

Electric street-car service was inaugurated in Matanzas and Cardenas, Cuba, on Dec. 17. The *Diario de la Marina* says that much enthusiasm greeted the opening of the new car service, and it is believed that the tramways will assist greatly in the development of these cities.



MATERIALS HANDLING IN SAN FRANCISCO—DERRICK CAR PULLING UP OLD CABLE CONSTRUCTION



MATERIALS HANDLING IN SAN FRANCISCO—FIVE-TON CRANE CAR REMOVING OLD TRACK

How Construction Materials Are Stored and Handled in San Francisco

By B. P. LEGARE

Chief Engineer Maintenance of Way & Construction United Railroads

IN San Francisco we are using methods of handling and storing materials which have been developed gradually to fit the requirements of our particular problems. In looking over the article by R. C. Cram in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 23, 1916, I find therein but little in common with our system. However, the very fact that two railway systems can rarely utilize identical methods creates a need for a variety of information on this subject, and is in itself a good reason for compiling and publishing the methods of various companies in solving their material-handling problems.

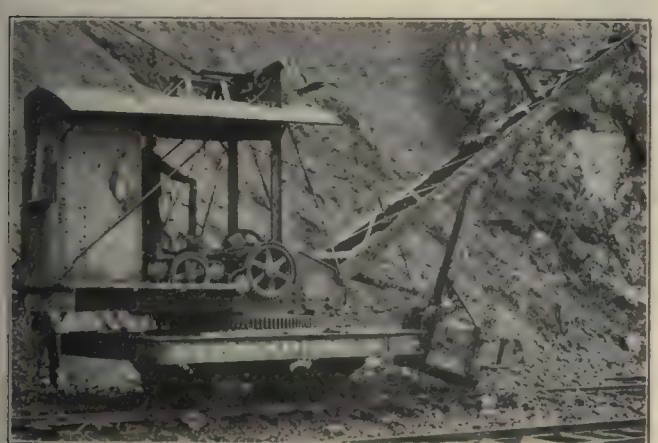
The United Railroads employs no one yard where materials are delivered for general distribution. This is partly because materials are received by rail and by water at different points of delivery, and partly because considerable area for storage purposes is not available near the center of the system. However, by adhering to a system for handling each class of material it has been found possible economically to conduct the accounting and checking of materials at the same time that their convenient distribution is facilitated by the use of the several storage points.

The Brannan Street yard is located near the center of the United Railroads' system, and although of small area it is found well suited for storing materials which are most frequently called for, as well as all materials which are delivered to the company from barges, this location being only a short haul from the waterfront.

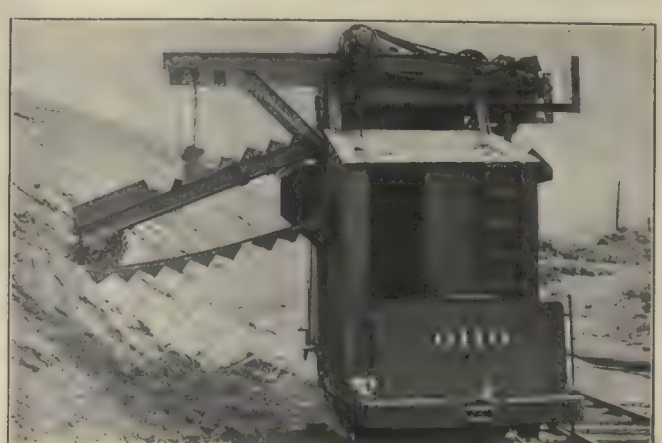
In this yard are stored all old and new ties, cement, brakeshoes, barreled asphalt, trolley wire, track bolts, crossarms, pole fittings, etc. A single track traverses the yard along the center line, whence materials are delivered to cement shed or storehouse on either side. The rear portion of the yard is reserved for storing ties.

This company finds it most economical to use no mechanical equipment in handling ties, although common labor costs as much as $2.50 per nine-hour day. The ties are loaded from boats directly onto flat cars by slings, and in the Brannan Street yard the ties are passed by hand, one at a time, from the cars to men on the ground. They are then stood up on end in the tie storage space. Thus it is never necessary to take the time to pile them up, and when taking them from storage a man never has to bend over to pick up a tie.

Old ties when brought into this yard from reconstruction work are dumped on the opposite side of the track from the new ties. The old ties are later sorted, and those considered unfit for further use are sawed



MATERIALS HANDLING IN SAN FRANCISCO—ELECTRIC CRANE CONVERTED FOR USE AS SHOVEL



MATERIALS HANDLING IN SAN FRANCISCO—SAND ELEVATOR READY TO LOAD FROM BANK

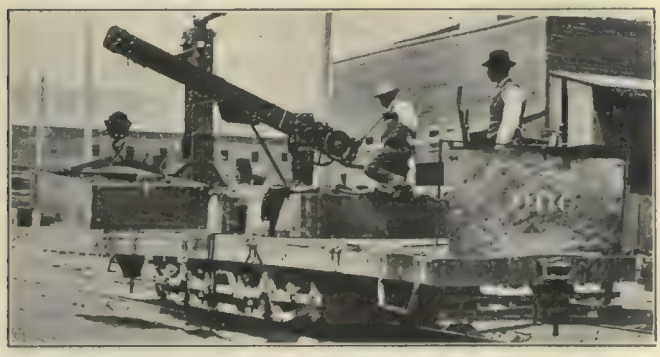
into three lengths for firewood. For this purpose a motor-driven circular saw is used, this being mounted on a small wheeled truck with an arrangement for taking power from the trolley.

Shops and Main Storage Yard

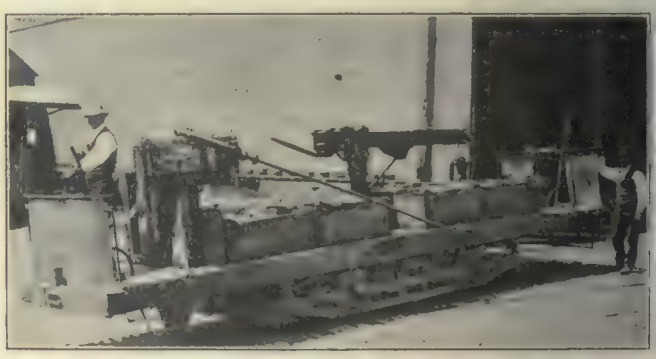
About 5 miles from the center of the system the company maintains the Geneva Street yards, where the shops are located and where the larger and heavier equipment and materials are usually stored. This yard is provided with about 2 miles of track and ample space for storing special work, paving brick, rails and all materials received by rail. A spur track from the Southern Pacific Railroad makes connection with the company's lines at this point. The company's 5-ton crane car, derrick car, electric shovel and similar rolling stock are usually kept at this yard.

The 5-ton crane is used in place of derricks in the yard to handle all steel materials. This crane is mounted on a truck equipped with the usual motors so that it can be dispatched to any part of the system. It unloads and piles special work, scrap iron and whatever heavy material there may be to be handled in the yards, and is also employed on construction work for laying track. It is mounted on a turntable with full circular swing, the motors operating the crane being separate from those for propelling the car.

The derrick was built up in the company's shops, and is used chiefly in construction and reconstruction work. It operates the plow in breaking up the surface preparatory to excavation, operates a ¾-ton hammer for breaking up pavement, or tears up cable road construction when cable lines are being replaced with tracks for electric operation. The company also has another derrick built entirely of steel, which it was decided would be more useful if equipped with a bucket such as is used on steam shovels. Accordingly, a ¾-yd. bucket was attached by means of a hinged joint, and this arrangement has been found very useful.



MATERIALS HANDLING IN SAN FRANCISCO—ASPHALT CAR UNLOADING BOXES



MATERIALS HANDLING IN SAN FRANCISCO—ASPHALT CAR COMING FROM MIXING PLANT

Three portable rock crushers are used for breaking up the concrete removed from old cable railway conduits. Although the company operates its own rock-crushing plant, and can deliver crushed rock for ballast very economically, it has been found cheaper to employ these small rock crushers in reconstructing cable lines because their use eliminates the necessity for hauling away the concrete removed from the old track. The crushed concrete is piled along the line from which it was taken, and as soon as the new track is down it is used for ballast.

Handling Sand and Crushed Rock

Excellent sand is secured for maintenance and construction without going off the company's right of way. The sand conveyor shown in an accompanying illustration can load a 16-cu. yd. car in ten minutes from the sand dunes through which the line has been located in some of the outlying districts. This sand is rather fine, but has proved excellent material for making concrete. It is also suitable for use on the cars and for mixing bituminous compounds, although for this purpose it is passed through sand dryers and thence to sand bins. An unlimited sand supply is so conveniently located that there is practically no necessity for storage facilities.

The company maintains a rock-crushing and screening plant on the outskirts of San Francisco at Daly City, where a maximum of about 200 cu. yd. per day can be produced. Owing to an arrangement with private companies for the securing of emergency supplies of crushed rock, no storage is provided for this material, and it has been found convenient to deliver from the crusher direct to the construction job, even when the requirements of the work call for as much as 300 cu. yd. of crushed rock per day.

The Daly City plant is also the depot for storing second-hand paving block. This is in order economically to dispose of broken pavers and the spalls which result from cleaning by hand the paving blocks removed from the street. All of this waste material is dumped into the crusher.

Handling Asphalt in Boxes

The company also maintains a blacksmith shop and general storehouse at Market and Valencia Streets, and here is located the asphalt mixing plant. A feature of handling asphalt is the specially designed car containers which are used for delivering the mix. A special car has been built with a hinged post on which the trolley is supported. The post can thus be easily lowered so that the car can pass under the asphalt mixers and receive its load by gravity. While the trolley pole is down power is supplied by 60 ft. of "fishline" connecting the trolley pole directly with the contactor board. This length of line is sufficient to allow the loaded car to move out to a point where the trolley is again put in service.

Before going under the asphalt bunkers four shallow boxes with a capacity of about 1 cu. yd. each are placed on the car by means of a derrick boom from a centrally located mast. When desirable two tiers, or eight boxes per load, are handled. After asphalt has been discharged into these boxes each unit is covered with a layer of carpet and the car proceeds to the paving job. Upon its arrival there the boxes are unloaded by the derrick boom and the boxes are kept covered up to the time that the material is actually required. It has been found possible to deliver asphalt 20 miles by this method and still have the material sufficiently hot upon its arrival at the job.

Illinois Association Holds Annual Meeting

At Chicago the Illinois Electric Railway Association Discussed Papers on the Economy of Raising Voltages for Railway Motors, the Training of Motormen and the Design of Interurban Headlights, Together with Reports from Standing Committees

A WELL attended meeting of the Illinois Electric Railway Association at the La Salle Hotel, Chicago, Jan. 19, was occupied with papers of interest particularly to operating men. One of them dealt with the effect of low voltage on railway motors and pointed out the economies to be realized from raising the trolley voltage even by small amounts. Another was devoted to the subject of headlights, and in a third the training of motormen was discussed. The meeting was ably presided over by Second Vice-President D. E. Parsons, general manager East St. Louis & Suburban Railway, in the absence of President J. R. Blackhall and First Vice-President C. F. Handshy.

COMMITTEE REPORTS

Reports of the several standing committees were called for after the association had listened to the reading of the minutes of the two preceding meetings by the secretary, W. V. Griffin, secretary and treasurer Chicago Elevated Railways. John Leisenring, Illinois Traction System, chairman of the engineering committee, stated that this committee had confined its activities during the early part of the year principally to consideration of the Bureau of Standards' electrical safety code. Later it was learned that the Illinois Public Utilities Commission was not going to adopt the Bureau's code, but instead was to draw up one of its own, and the attention of the committee had then been directed to the proposed code for the state. A joint committee from the Illinois Electric Railway Association and the Illinois Electrical Association had held two meetings and had filed with the commission a statement covering the objectionable points of the proposed code. The rules have since been greatly modified, being issued finally in December but dated in October. This committee also had held several meetings with the engineering staff of the commission, and as the result of the general co-operation it was believed that the final draft of the code was fair and workable.

Since a meeting in May at which all the telephone, telegraph, electric light and railway interests were represented and which was the last public hearing on the code, the commission put in a rule requiring the numbering and lettering of all poles in cities and municipalities and every fifth pole on transmission and other rural lines. This, of course, would entail a considerable burden on a great majority of the companies, and the joint committee of the two associations asked for a hearing, which was held Jan. 17. As a result of this, Mr. Leisenring felt that the commission would surely find it necessary to eliminate this rule or modify it to a large extent. It was brought out at this hearing that the additional expense to which the commission would be subject in the work of locating certain poles which might be involved in any action, if they were not all numbered and lettered, would amount to perhaps $200 a year. The Chicago Telephone Company offered to donate this amount to the commission, since if the rule were enforced it would cost this company $100,000 for the first numbering and lettering and $20,000 a year to continue the practice.

W. B. Potter, Illinois Traction System, chairman of the traffic committee, recommended to the association that steps be taken to withdraw if possible the interchangeable mileage books which sell at $8.50 for $10 in mileage. It had not proved popular because several of the participating companies had individual mileage books which sold at a more attractive discount. This brought out the fact that some of the members were not at all in favor of discontinuing this association mileage book, and there was pointed out the need for the succeeding traffic committee to work out a new mileage book which could be sold with a uniform discount inducement on all properties. Mr. Potter also recommended that the companies adopt some uniform system of advertising, and laid emphasis on the importance of placing timetables in the official railway guide. He believed that the interurban companies were losing considerable business because of the fact that this guide was the place where passenger agents looked for information and, when a line was not listed there, looked no further.

F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway, added to the report of the traffic committee the considerations which had been under way in regard to transportation of baggage by interurban lines. The Illinois Commission had proposed the carrying of baggage on the same basis as the steam roads, namely, 150 lb. free with every full fare and excess charge for weights over this amount. A hearing had been held before the commission at which it was clearly brought out that since the conditions of handling were so complicated and varied it seemed impossible to establish any uniform rule. As a result the commission apparently was holding the matter in abeyance.

TECHNICAL PAPERS

The rest of the morning session was devoted to the reading of two papers, one by K. W. Mackall, electrical engineer Ohio Brass Company, on "Headlights," and the other on "The Effect of Low Voltage on Railway Motors," by G. M. Woods, Westinghouse Electric & Manufacturing Company. The latter paper appears in this issue. The former was published in ELECTRIC RAILWAY JOURNAL for Dec. 2, 1916. In discussing Mr. Mackall's paper, W. McK. White of Holden & White told of several tests in which the results corroborated the statement in Mr. Mackall's paper that a yellow beam light will penetrate a fog to a greater distance than a white beam. This feature is particularly prominent when the light is used as a marker or harbor light. For this reason the Navy Department and rivers and harbors commissions have adopted the yellow beam projector quite generally. In answer to a question by the chairman as to using incandescent lamps in headlights, Mr. White remarked briefly that the Milwaukee Northern Railway had found this type of headlight equipment very satisfactory, this company having made use of the Watson car lighting regulators in connection with the headlight and car lighting on all its cars.

In the discussion on Mr. Woods' paper, Mr. Parsons told how his company had saved itself the expenditure

of $120,000 for copper by increasing the trolley voltage on the system about 100 volts. He said that the equipment on his cars included GE-67 and GE-70 motors as well as Westinghouse No. 49 and No. 56 motors wound for 500-volt service. The manufacturers advised him against raising the voltage when he proposed this means of improving the conditions, but he decided the experiment was worth trying. During the first week twenty-five armatures were burned out and the second week fifteen armatures. These were thought to be old motors which were probably in bad condition anyway. Then it was soon found that some of these rewound motors were causing trouble, and so new armature winders were employed. The insulation was increased and the brush holders changed, and since then these same motors have caused no trouble, the service being greatly improved with the saving noted above.

ELECTION OF OFFICERS

During the luncheon which followed, the nominating committee made its report and the secretary was instructed to cast the ballot of the association for the following officers:

President, C. F. Handshy, assistant general manager Illinois Traction System, Springfield, Ill.

Vice-president, D. E. Parsons, general manager East St. Louis & Suburban Railway.

Second vice-president, Frank J. Baker, Middle West Utilities Company, Chicago.

Executive committee: Chairman, J. R. Blackhall, general manager Chicago & Joliet Electric Railway, Joliet, Ill.; F. E. Fisher, Britton I. Budd, E. C. Faber, H. E. Chubbuck and T. F. Grover.

Immediately after luncheon the members were treated to the motion picture film "King of the Rails," which in a most interesting manner familiarizes the observer with the construction details of the Chicago, Milwaukee & St. Paul electric locomotives as they were assembled in the Erie plant of the General Electric Company and with the significance of their operation over the 400-mile mountain division of this railway. This was followed by Mr. Feron's paper on training motormen, an abstract of which appears below.

President Blackhall was present at the afternoon session and was called upon for a few remarks. He reviewed briefly the work of the association during the year. In general, he laid stress upon the need for further operating economies, and made mention of some of the notable improvements in equipment, particularly the automatic substation.

Training of Motormen on the Chicago Elevated System

BY M. J. FERON

General Superintendent of Transportation
Chicago Elevated Railways

On many city and interurban lines new men are employed and enter the motormen's class direct. In many cases these men are unknown to the officials. After their references are looked up, they are sent out on the various lines or divisions with regular motormen to receive the necessary training to qualify them for work. These students, as a rule, are on probation for a period of ten days or two weeks or until their qualifications are approved or rejected. During this period they are expected to familiarize themselves with the equipment, rules and regulations of the company regarding speed, deportment, accidents, etc. They must also familiarize themselves with the city and village speed ordinances, police rules on the streets, proper stops and numerous other details.

It is my opinion that a student who is broken in in this manner leaves the probation period with a mind so confused with innumerable details that he is uncertain as to whether or not he is carrying out his orders properly. I feel quite certain that a man being trained for the position of motorman should receive time to absorb all of these instructions so that they cannot be forgotten or misinterpreted before he is considered competent to be sent out as a motorman.

On the Chicago Elevated Lines promotions are made from the train service to the motorman's class. In this way we get the benefit of the knowledge a man will acquire while working as a trainman for a year or more. All trainmen employed on the elevated lines are first hired as extra trainmen. These men are generally about twenty-four or twenty-five years of age and are not allowed to work on a train except under the supervision of a regular conductor. Before they are employed they must pass a rigid physical examination. If they are passed by the doctor they are then sent to the superintendent, and if he believes they have the necessary qualifications to make trainmen they are sent with a regular conductor to break in, and generally put in from a week or ten days with him learning the duties of a trainman. After having served as an extra trainman for a period of six or more months they are allowed to break in or become an extra conductor, and after one year's service with the company they are allowed to make written application to the superintendent to learn the duties of a motorman. These applications, however, must be approved by the dispatcher or the one in direct authority over the applicants before being sent to the superintendent. This is done so that the superintendent who issues the permit to a trainman to break in for motorman may have the benefit of the judgment of one who has had an opportunity to observe the habits, deportment and other qualifications of the applicant and knows whether or not he is naturally careless or careful.

When the superintendent receives the application he makes further investigation in regard to the man by consulting the trainmaster, the supervisors and the man's record card. If the superintendent then finds the man desirable and believes he possesses the necessary qualifications for a motorman, he will call him to the office and give him a good talk on the requirements of a motorman and what is expected of him. A regular motorman is then selected to break in the student, and the latter receives a card or permit to ride with that particular motorman at any time. As stated before, the student, in most cases, is an extra man, and while he is not engaged in the train service, instead of loafing around the train room, "killing" time, he spends his spare time with the motorman learning his new duties. All of our students break in on their own time, and it requires from four to six months and even longer before the motorman will return the permit indorsed with his O.K. to the superintendent.

The motorman who is breaking in the student realizes the responsibility he assumes in declaring his student competent to act as a motorman, especially so on account of a personal blank which the motorman must fill out and send to the superintendent when he passes his student. On this blank the motorman fully states any points of weakness he has observed in the student. This blank is kept strictly confidential between the motorman and the superintendent. With this information before him, the superintendent is able to dwell upon the weak points when the student comes in for examination. The supervisor, under the direction of the superintendent, also watches this man when on the road for this particular fault, and in that way, very

often, we make a man strong where he was inclined to be weak.

By our method of training men for motormen, the student rides with one motorman only from the time he starts to receive instructions until he is thoroughly broken in. We also confine the student to one division and keep him on that division until he is thoroughly qualified for motorman. We think this is a considerable help, for when the student is operating only over one division he will have fewer details to remember and comprehend than he would if he had to learn the duties on several divisions at the same time. We find that once a man has been fully qualified to operate a motor on one division, it does not take him long to go on any other division and learn the details there, as all he is obliged to learn then is the operating rules for that particular division.

After a student is turned in as fully competent he is called before the superintendent and required to pass a rigid oral examination. If this examination proves satisfactory to the superintendent, he is then sent to the general superintendent, where he again attends a lecture in regard to speed on curves, operation of trains in fogs and other points of this kind. After the general superintendent has finished his instructions the man is considered a competent motorman and may be used as such when occasion requires. We feel that this method of training cannot fail to impress upon the student the responsibility of the position of a motorman, and as a rule we make him a careful, alert and competent man.

This method gives the company the benefit of the familiarity with the system and with the general operating conditions derived while the man is serving as a trainman, it provides a sufficient number of extra motormen to cover all emergencies, and gives the company an opportunity to judge of the man's responsibility before placing him in the motorman's position. We have 378 regular motormen and 224 extra motormen, and we have, on an average, sixty-five students passed as competent motormen each year.

Effect of Low Voltage on Railway Motors

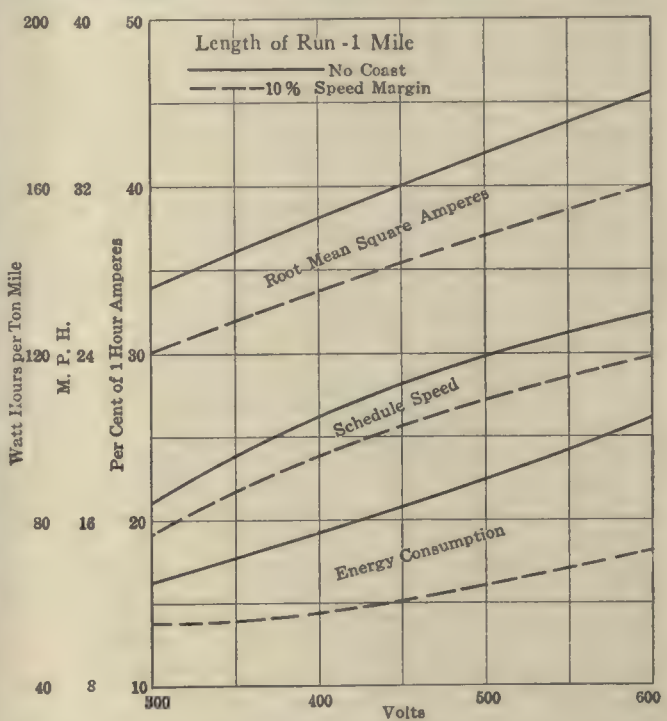
BY G. M. WOODS
Westinghouse Electric & Manufacturing Company.

The speed of a series motor at any given current is directly proportional to the counter emf., that is, to the impressed voltage less the drop in the motor itself. The line voltage impressed on a railway equipment has, therefore, an important bearing on the performance of that equipment. Voltage affects schedules, energy consumption and motor heating. The effects of low voltage are for the most part undesirable and hence demand serious consideration.

The effect on schedule speed is the most readily observed feature of low voltage. It is well known that in a specific service a lower voltage involves a lower schedule speed, or a reduction in margin for making up lost time, or both. If service conditions are such that an equipment is able at a given voltage to make a certain length of run without coasting, it is found that an increase in voltage produces a comparatively small speed margin on very short runs, while on long runs for the same voltage increase, the speed margin may be relatively great. This indicates that for the reasonable maintenance of schedules, it is necessary on suburban and interurban lines to maintain better line voltage conditions or apply equipments with greater leeway in speed than would be necessary on a city line. Since the maintenance of good voltage is more difficult and expensive on interurban than on city lines, the alternative of higher speed equipment is usually adopted.

On every run, the time during which current is drawn by the motors is made up of two distinct parts, the period of notching up the controller and the period of running with the controller on full. The speed of the car before the controller is on the full-parallel position depends primarily on the motorman's rate of notching up the controller and is to a certain extent independent of the line voltage. The more marked effect of the change in voltage on the speed margin on longer runs is due to the fact that the motors are running at line voltage a larger part of the time.

The effect of voltage on the operation of car equipments will be examined from two standpoints; first, where the schedule can be adjusted to suit the voltage, and, second, where the schedule must be maintained irrespective of voltage. In the first case, the



EFFECT OF VOLTAGE—FIG. 1—RELATION BETWEEN VOLTAGE, ENERGY CONSUMPTION AND SCHEDULE SPEED FOR GIVEN RUN

schedule, energy consumption at the car and the motor heating will vary in the same direction as the line voltage.

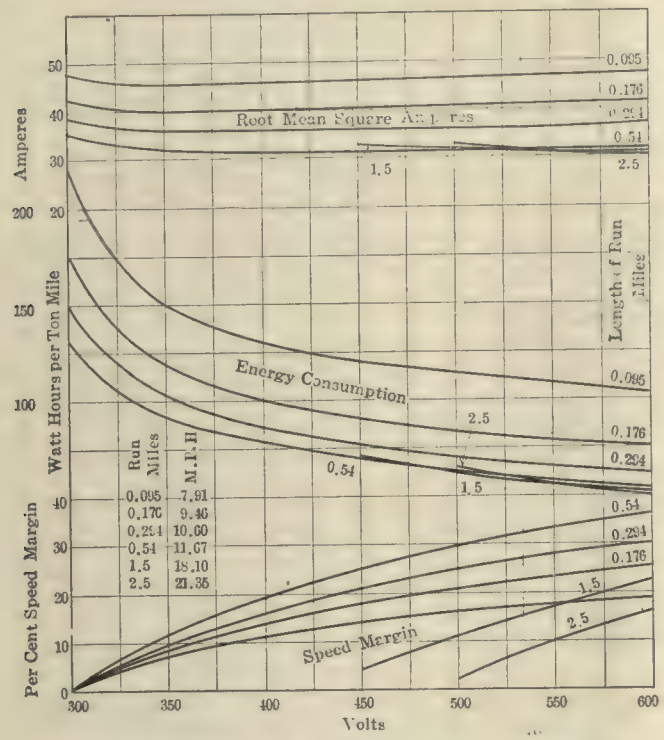
For example, under certain assumed conditions and with a typical railway equipment, it has been found that on the basis of constant speed margin, a reduction in generator voltage from 550 to 450 results in a reduction in schedule speed of 5 per cent for an average run of 1000 ft., and a reduction in schedule speed of 10 per cent for an average run of 1 mile. These percentages are approximately constant so long as the comparison is made on the basis of the same percentage of speed margin for both voltages.

Under these same conditions, the heating current is reduced about 9 per cent, both on a 1000-ft. run and on a 1-mile run, and this percentage varies but little for different speed margins so long as the comparison is made on the basis of a definite speed margin.

Energy consumption would be reduced 17 per cent at the car on a 1000-ft. run and 13 per cent at the car on a 1-mile run, the percentage being slightly greater when the comparison is based on runs without coasting than when based on runs with sufficient speed margin. This reduction in energy consumption at the car is due almost entirely to the reduction in schedule speed. If the lower voltage were assumed to be due to drop

in trolley and track circuits, the energy consumption measured at the substation would actually increase by 1.3 per cent on the 1000-ft. run and 5.7 per cent on the 1-mile run.

As an example of the conditions prevailing where the schedule must be maintained, irrespective of voltage, it has been found that an increase in generator voltage from 450 to 550 results in a 28 per cent increase in percentage speed margin on a 1000-ft. run and a 32 per cent increase on a ½-mile run. The same increase in voltage results in a 12 per cent decrease in energy consumption at the car on a 1000-ft. run and a 20 per cent decrease at the car on a ½-mile run. If the assumed lower voltage is due to drop in the trolley and track circuit, then with the higher voltage at the car, the energy consumption measured at the substation decreases 28 per cent on the 1000-ft.



EFFECT OF VOLTAGE—FIG. 2—RELATION OF VOLTAGE AND CURRENT CONSUMPTION OF MOTOR FOR VARIOUS LENGTHS OF RUN AND FIXED SCHEDULE

run and 35 per cent on the ½-mile run. The energy consumption decreases as the voltage increases because with higher voltage the car gets up to speed more quickly, in making a given schedule more coast is obtained, and the brakes are applied at a lower speed. The lower energy consumption is the result of less loss in the heating of wheels and brake shoes.

Under any given set of conditions there is one voltage giving a minimum heating current, which will increase if the voltage is either raised or lowered.

Fig. 1 shows the effect of voltage on schedule speeds, energy consumption, and heating current. It will be noted from these curves that as long as acceleration and braking rates, length of run, length of stop and speed margin remain constant, the schedule speed, energy consumption at the car and heating current vary in the same direction as the voltage.

Fig. 2 shows the variation in heating current, energy consumption and speed margin for several lengths of run from 0.1 mile to 2.5 miles, with voltages from 300 volts to 600 volts. For the four short runs, the schedule is such as can be made at 300 volts without coasting. The short runs are taken on that basis since the comparison can be made over the entire range of voltage chosen. On the two long runs, however, at higher voltages, the car makes the distance and coasts to a standstill in less time than required for the run without coast at 300 volts. In order to obtain a wider range of comparison, the schedule is taken as that which can be made at 600 volts when coasting to a standstill without any braking.

While the effect on speed margin and energy consumption is marked, the effect on heating current is comparatively slight. The ability of a car to maintain schedules under varying traffic conditions as measured by the speed margin, and the size of the power bill as measured by the energy consumption, are of primary importance to the operating man. The maintenance of an equipment is affected to a certain extent by the temperature rise obtained on the motors in their average service. It is doubtful, however, if the degree to which motor heating is increased by reasonably increased voltage will ever be reflected in any maintenance reports, provided running time is kept the same. With higher voltage, the coasting time is longer and brakes as a result are applied at a lower speed. This reduces the brake shoe and wheel wear and tends to counterbalance the theoretical increase in motor maintenance due to higher temperature.

With regard to motor heating, it is of interest to note that low voltage will often cause the overheating of a motor equipment on long grades. On account of the lower speed resulting from decreased voltage, the time on the grade may become sufficiently long to exceed the motor's thermal capacity, overheat the brushes or otherwise produce poor commutating conditions. This is particularly true of locomotives, since they will generally be more heavily overloaded on grades and operate at lower speeds than motor cars.

With extremely high resistance in trolley and track circuit it is sometimes possible actually to obtain a higher speed with the motors in series than with the motors in parallel. Assume as an example the following somewhat abnormal conditions: A single track section of road laid with 60-lb. rails and fed from one end by a single No. 0000 copper trolley wire. The total resistance per mile would be 0.305 ohm. If the substation voltage is 625 volts, and a car with quadruple motor equipment at the end of the line, 5 miles from the substation, is drawing 70 amp. per motor, the voltage at the car with motors in parallel is 198 volts. The voltage at the car with motors in series-parallel is 412 volts and the voltage per motor 206. The voltage per motor is, therefore, in the example chosen, 8 volts more with the motors in series-parallel, than with the motors in full parallel and the speed of the car would be 5 per cent higher. With any higher current per motor, the voltage drop would be greater and the difference in the voltage per motor with motors in series-parallel and with the motors in full parallel would increase as the current per motor increases.

REMEDIES FOR LOW VOLTAGE

One of the most easily remedied causes of low line voltage is low generator, or low-substation voltage. Generators and rotary converters are frequently operated below their rated voltages, whereas they can often be operated satisfactorily at 10 per cent above rated voltage. However, any contemplated increase in voltage should first be taken up with the manufacturer. Also, many roads are still operating cars equipped with motors that have been in service from ten to twenty years. Such motors are not only without commutating poles, but in many cases, the creepage distances and class of insulation are not suitable for any great voltage increase. However, by putting such motors in good shape and keeping them clean certain types

may be made safe for voltages higher than that for which they were designed. For example, it is a matter of record that one road raised the substation voltage from 600 volts to 725 volts and by having taken the above precautions has successfully operated a large number of Westinghouse No. 56 non-commutating pole motors at the higher voltage.

Series running on grades reduces the voltage drop since the current drawn from the line is just half the current drawn when the motors are in parallel. The speed in series may not be higher than that in parallel as was the case in the abnormal example previously given, but due to decrease in drop, it will be considerably more than half the speed with the motors in parallel and other cars in the same section of the line will benefit from the higher average voltage.

On interurban lines the maximum current taken by any one car has a considerable effect on the voltage drop. By accelerating in series more rapidly than at the average rate required, and less rapidly in parallel, the peak current from the line and consequently the drop is kept below the value which would be obtained otherwise. This improves the average voltage at the cars.

Another condition which causes low voltage on interurban roads is the passing of two cars at a siding. Frequently one car stops and the other slows down to a low speed. Both cars then accelerate at once and an extremely low voltage results. If the motorman of the second car, having seen that the first car is in the siding, and the way is clear, would run by at a fairly high speed, and then coast, the first car could accelerate, while the second car is drawing little or no current, and the maximum drop would be greatly reduced. On account of track conditions, however, it is not always possible for the second car to run by at a high speed, but any effort to obtain co-operation between the motormen under circumstances of this kind will in a majority of instances be rewarded by better voltage conditions.

To Prevent Electric Railway Strikes

Public Service Commission for First District of New York Proposes Plan Involving Wage Boards to Settle Wage and Other Disputes—Hearings to Be Held on Proposed Bill

OSCAR S. STRAUS, chairman of the Public Service Commission for the First District of New York, on Jan. 22 made public the tentative details of a plan by which the commission hopes to avert future strikes on electric railways in New York City. The main features of the proposed scheme are the creation of wage boards to certify to the commission findings on all matters of wages and working conditions that cannot be privately adjusted, and the prohibition of strikes pending settlements, which cannot be turned down if approved by the commission.

Since the strikes in New York City last August and September, the commission has been considering the proposal of legislation to remedy the strike evil. As a result of its study of the weaknesses of the existing public service law, as well as of the needs of the companies, the employees and the public, it has now presented a tentative plan for public criticism. In about a week public hearings will be begun, after which a bill in final form will be drafted.

Advantages Stated by Commission

According to the announcement by the commission, it is believed that the proposed plan has the following advantages from the point of view of the railways: (a) Registration of trades unions and agreements; (b) decision of wage disputes or other grievances upon the basis of fact; (c) maintenance of discipline and efficiency; (d) reasonable permanency of the staff, and (e) avoidance of interruption in the service.

The plan, it is also believed, will promote for employees on electric railways: (a) Freedom to organize; (b) proportional representation on a wage board; (c) fair and reasonable wages and working conditions; (d) redress of legitimate grievances; (e) power to negotiate collectively with employers; (f) faithful enforcement of agreements and awards relating to wages and working conditions, and (g) security of employment.

On the other hand, the public will feel that there will be: (a) Fair consideration of wage increases and working conditions; (b) rate adjustments based thereon; (c) uninterrupted service; (d) better and more efficient service through reasonable security of tenure to employees and best possible working conditions; (e) avoidance of accidents due to inexperienced men, and (f) complete supervision of the service.

In short, it is said, the proposed plan will give the widest opportunity for private negotiation consistent with regard for the public interest, to promote amicable adjustment by agreement, to insure knowledge of conditions and fair determinations through the aid of wage boards, selected by the parties themselves, reserving that supervision necessary for the protection of the "third party." In addition, it will seek to secure power conspicuously absent from the present law, *i. e.*, the power to enforce agreements after they are made.

The Complete Proposal

The full text of the tentative proposal is published below:

1. *Wages and Working Conditions:*

Street railroads shall provide for the payment of fair and reasonable wages and salaries to all employees engaged in the service and make provision for fair and reasonable working conditions in the performance of such service.

2. *Duty of Company to Provide Adequate Number of Employees:*

Every street railroad shall procure and have such employees in service, adequate in number, competent, and governed by rules and regulations as to discipline, competency, wages, hours of work, working conditions, employment, promotion, benefits, retirement upon pension or otherwise, discharge or termination of service or reinstatement, and contract or terms of employment, in accordance with the provisions hereof, as shall secure continuous, uninterrupted, safe and adequate transportation of persons or property and promote the security or convenience of employees, passengers, shippers or the public.

3. *Method of Determination:*

The determination of what shall constitute fair and reasonable wages and salaries and fair and reasonable working conditions shall be made either by:

a—Mutual agreement between employer and employee;

b—The wage board, constituted as hereinafter provided; or

c—The commission of the district having jurisdiction over the employer.

4. *Organization of Employees:*

Any ten or more employees engaged in any branch of any service over which the commission has jurisdiction may form an association or union, or branch or local of any existing association or union, and this shall thereupon have the right to represent its members in all negotiations with employers and to be heard in any proceeding in any manner relating to wages or working conditions affecting its members, upon making and filing semi-annually with the commission:

a—A certified copy of its articles of association, certificate of incorporation, by-laws, rules or governing regulations;

b—A full and true list of all its officers;

c—A full and true statement of the number of its members and the branches of the service in which they are employed; and

d—A consent in writing, signed by its duly authorized officers, to accept and abide by all decisions, awards and orders of the commission or the wage board, when approved by the commission.

5. *Negotiations and Agreements With Employers:*

Any association or union registered as provided may negotiate with any employer under the jurisdiction of the commission for the purpose of establishing a joint agreement upon wages and working conditions. Upon application by the employer or by such an association or union of employees, the commission shall designate an impartial person to preside over such negotiations, who shall have no power to decide or vote upon any of the subject matters involved in the negotiations.

6. *Wage Board, How Constituted:*

The commission shall make suitable rules and regulations for the establishment of a wage board or boards, whose duty it shall be to make investigation and to certify to the commission its findings upon all matters of wages and working conditions. Any association or union registered as provided shall be entitled to nominate upon such board such number of members as the commission shall determine is reasonably proportionate to the number of members in such association or union, with due regard to representation thereon of unorganized employees and taking into account the total number of all employees. The employer shall be entitled to nominate such additional number of representatives as shall be equal to the total number of representatives of employees.

If such nominations shall be approved by the commission, it shall organize and complete such wage board, shall provide suitable accommodations for its work and shall provide such clerical, statistical and other assistance as may be required for the due performance of its work. The members of such wage board shall receive such compensation for their services as shall be fixed by the commission, which shall be paid by the State Treasurer, as are the expenses of the commission for the Second District.

7. *Hearings and Determinations:*

All applications for the fixing of wages or working conditions not established by mutual agreement shall be referred to the wage board for hearings and findings. Upon its report, the commission shall make a determination which shall be binding upon all parties concerned.

If the wage board shall fail to agree, or if there be no wage board established, then such hearings shall be had before the commission and the commission shall make its determination upon its own findings.

Applications hereunder for a wage determination shall not be made until reasonable opportunity shall have been given both employer and employees to come to a mutual understanding. The wage board, or, in case of its failure to agree, or if there be no wage board established, then the commission shall determine what is such reasonable opportunity.

8. *Agreements, Rules and Schedules to Be Filed:*

Agreements, rules or schedules regulating wages or working conditions shall be filed with the commission and shall be subject in all respects to its approval.

9. *Grievances, Adjustment:*

The maintenance of discipline and efficiency shall rest with the employer. Any employee deeming himself aggrieved and unable to obtain redress from his employer may petition either the wage board or the commission for an investigation of his grievance. If, upon such investigation, either the wage board or the commission shall find that he is justly aggrieved, it shall make such order and award in the premises as it deems fair and reasonable and for the good of the service, including the reinstatement of a discharged employee, and, in such case, the award of back pay.

10. *Existing and Future Contracts:*

All existing contracts fixing wages or working conditions shall remain in full force and effect. No person regularly engaged in an operating service, including the furnishing of motive power for the service, as motorman, driver, conductor, engineer, trainman, brakeman, fireman, switchman, or otherwise, shall be engaged or retained in the service for an indefinite period, or upon a hiring at will. The parties shall fix a definite period or term of service; and in the absence of any other agreement, it shall be understood and implied that the period or term of service is for one year, and thereafter from year to year, unless terminated upon thirty days' notice.

11. *Limitations, Strikes and Lockouts:*

Pending negotiations, investigation and determination as herein provided, there shall be no lockout or strike on any service subject to the provisions hereof and no action shall be taken in group or concert or by agreement tending to interrupt the service; but nothing herein contained shall be construed to prevent employees from organizing to improve or better their conditions in accordance with the provisions hereof.

12. *Penalties:*

A violation of any of the provisions hereof by any person, firm or corporation, officer, agent or employee of an association or union, or by any employer, officer or agent, shall constitute a misdemeanor punishable by a fine of not less than $..... or more than $.....

13. *Application:*

These provisions shall apply to street railroads and to employees and organizations of employees engaged in the service of such street railroads.

Compulsory Health Insurance Opposed

Departmental Reports at Meeting of National Civic Federation Show Industrial Progress and Needs

VARIOUS questions, ranging from the status of female labor to military preparedness and international peace, occupied the attention of the National Civic Federation at its annual meeting in New York City on Jan. 22-23. The points of most direct interest to the electric railway industry were the discussion in opposition to compulsory health insurance and the departmental reports on welfare work, workmen's compensation legislation and conservation of human life in industry.

DEPARTMENTAL REPORTS

Disclosure of a source of enormous financial loss in American industry and announcement of the projection of a movement to prevent it by the organization of state committees of employers in the various industrial states were made in the report of Louis A. Coolidge, chairman of the welfare department. "Unnecessary 'hiring and firing' in factories, due largely to unintelligent methods of dealing with the workers, is responsible," said Mr. Coolidge, "for a national waste of many million dollars every year, and this loss can be prevented to a great extent by according better treatment to employees as regards wages, working conditions and other factors."

The calling of a national conference to discuss the necessity of state legislation throughout the United States requiring employers to compensate workers who contract occupational diseases was urged by August Belmont, chairman of the workmen's compensation department. The enactment of special statutes covering occupational diseases, apart from accidents, would render sickness insurance legislation unnecessary. Mr. Belmont said that thirty-two states and three territories now have laws compelling employers to compensate workmen or their dependents for loss through injuries or death by accident, arising out of or in the course of employment, and added that there is reason to believe that ultimately Congress will enact a federal workmen's compensation law covering employees engaged in interstate commerce, particularly railroad workers. Mr. Belmont deplored the lack of uniformity in the compensation laws of the various states, and he urged that compensation laws be made to apply universally to all employers and not be limited to alleged hazardous occupations. After citing the drawbacks incidental to the different forms of insurance, Mr. Belmont stated that the most acute problem relates to the cost of medical attention and the right of the employee to select his own physician. He emphasized the necessity for standards on medical attendance, insurance, employments covered by the law, and a method of computing awards.

Louis B. Schram, chairman of the industrial accident prevention department, advocated the enactment of uniform safety legislation in the industrial states, better enforcement of existing laws, larger state appropriations for factory inspection, increased numbers of inspectors, and the establishment of safety museums in the principal manufacturing centers by federal and state governments. Mr. Schram showed how the enforced payment of compensation and the reduced premiums offered by insurance companies to employers who eliminate hazardous conditions in their establishments have stimulated the interest of employers in accident prevention. "But nearly all safety legislation is inadequate," said Mr. Schram, "and in some states there is a distressing failure to enforce safety laws owing in part to the insufficiency of appropriations and the small number of inspectors allotted to the work."

COMPULSORY HEALTH INSURANCE CONDEMNED

One session of the National Civic Federation was almost entirely devoted to a discussion of the principle of compulsory health insurance, labor leaders and representatives of large corporations holding that the scheme was an undemocratic and inadvisable experiment. A resolution in opposition to the plan was referred to the executive council.

The objections of representatives of organized labor seemed to be based on the belief that compulsory health insurance could not be administered without class distinctions and control over wage earners, that labor is satisfied with its union benefit funds and that it desires no one to assume any guardianship over itself. Samuel Gompers, head of the American Federation of Labor, sent a paper stating that the only agency which gets at the causes of poverty is organized labor, for this aims at higher wages as measured by American standards of living. If these are secured, workmen can insure themselves.

Corporation representatives told of the successful health and death benefit systems now in use and asserted that the state should not interfere and use compulsory methods where private efforts have not failed. A. Parker Nevin, general counsel National Association of Manufacturers, was of the opinion that before compulsory health insurance is ever tried, compulsory agencies for the prevention of sickness should be adopted.

Among others who participated in the discussion were the following: Warren S. Stone, grand chief International Brotherhood of Locomotive Engineers; John Franklin Crowell, executive officer Chamber of Commerce; Frederick L. Hoffman, former president American Statistical Association; Charles G. DuBois, comptroller American Telephone Company; S. T. Simmonds, the Celluloid Company; M. W. Alexander, General Electric Company; W. D. Kelley, Consolidated Gas Company of New York; Hugh Frayne, American Federation of Labor; Peter J. Brady, Allied Printing Trades Council, and Timothy Healy, international president Stationary Firemen's Union.

Publications on Labor

Two recent publications by economic bodies present additional data in regard to one of the most important present-day problems—that of labor. The first, the January, 1917, issue of *The Annals* of the American Academy of Political and Social Science (Woodland Avenue and Thirty-sixth Street, Philadelphia), contains a large number of articles discussing various aspects of the situation, such as regulation of wages, hours and working conditions; public employment bureaus, collective bargaining, compulsory arbitration or investigation, voluntary arbitration and conciliation, and the fixing of wages by utility commissions. Single copies may be obtained for $1.

The other publication referred to above is the one on "Labor Disputes and Public Service Corporations," published by the Academy of Political Science (Columbia University, New York), as the January number of its *Proceedings*. This volume gives the full text of the various papers presented at the recent meetings of the academy, reported in the ELECTRIC RAILWAY JOURNAL of Nov. 25, 1916, page 1106. It may be secured in paper for $1 and in cloth for $2. Like the first mentioned publication, it is a real contribution to the studies of how to solve the labor problem in a democracy.

Treated Wood for Ties and Paving

At the Annual Meeting of the American Wood-Preservers' Association in New York Special Attention Was Devoted to Treated Wood-Block Paving—Elaborate Service Records Covering This Material and Also Steam-Railroad Ties Were Submitted

THE annual meeting of the American Wood-Preservers' Association, which was held in New York City, Jan. 23-25, 1917, with an attendance of more than 200 delegates, reflected the growing general interest in treated wood as a surface for street paving through the assignment of one complete session to the subject. At this time a committee stated that a joint specification for wood-block paving had been approved by committees from six different technical societies for presentation to their respective associations. In consequence, the committee submitted a copy of this specification for adoption as standard by the American Wood-Preservers' Association in a form substantially the same as that submitted as information at the last convention.

This committee's report included a statement disapproving of the use of sand fillers or sand cushions for such pavements. Sand fillers are not waterproof and permit water to reach the base of the blocks, causing trouble from expansion. If the blocks dry out and shrink, the sand settles down in the spaces between the blocks, creating the possibility of further trouble if the blocks later become wet and expand. Instead of sand, the committee recommended either coal-tar pitch or asphalt filler.

The committee expressed a favorable opinion in regard to the practice of laying blocks on a smoothly-finished concrete base, particularly when the blocks are either dipped in pitch immediately before laying or when the blocks are set in hot pitch swabbed upon the concrete base. A new method was also recommended whereby the smoothly-finished concrete base is coated with bituminous cement, this being allowed to get cold and hard before setting the blocks upon it. This substantially removes the objection of high cost applying to the use of hot cement and also removes the objection in regard to difficulty of replacing faulty blocks. Nevertheless, after a day or more of service the blocks adhere firmly to the base. In an appendix to this report there was given an account of tests upon wood-block paving to determine the relative strength of treated and untreated blocks. These tests showed no appreciable change in strength due to treatment, such minor differences as existed being considered to be due to changes in the internal structure.

The committee on preservatives, through a sub-committee, reported very favorably in regard to the use of water-gas tar and oil for treatment of paving blocks, and special comment was made in regard to the uniformly high waterproofing value of this preservative material. In addition, the sub-committee was unable to find instances of decay in any of the water-gas-tar treated blocks inspected by it, nor was any such decay reported from uninspected work, although a number of installations had been in service for more than eight years. The report was favorable also in regard to permanency of oil in the blocks, ease and completeness of penetration and freedom from bleeding when water-gas-tar and oil were used. In consequence, the committee recommended that refined water-gas tar be recognized as a suitable wood-block preservative and submitted specifications for a standard of the association for this class of material.

Another committee presented a detailed summary of replies to an inquiry regarding experience with wood-block paving in each of a number of cities. Detailed information was given on the oldest wood-block pavement installed in each city and on the best wood-block pavement regardless of age, as well as on pavements that had failed in service. Replies to the first section of the inquiry showed the maximum life of pavement to be in the vicinity of seventeen years, and where the life had exceeded this, the paving was reported in bad condition. Practically all of the oldest pavements were laid with long-leaf yellow pine, but some Norway pine and tamarack that had been laid since about 1908 appeared in the record.

The wood-block pavement reported by the different cities as being the most satisfactory up to Jan. 1, 1917, included installations up to an age of only about seven years. Practically all of this material was long-leaf yellow pine, but some tamarack and Norway pine laid in 1913, and subsequently, was included among the most satisfactory pavements by certain cities, improved methods of treatment and laying the blocks in the street undoubtedly being responsible for this condition.

The most interesting feature of the report was the section covering wood-block pavements that had been reported by different cities as failures, or as being the most unsatisfactory according to local experience. Reports were received from seventeen cities and included three cases of decay, four cases of excessive wear and four cases of heaving, the remainder being miscellaneous in character. Of the three cases of failure caused by decay, one was thirteen years old and was said to be chargeable to insufficient penetration of the oil into the sap wood. The two others were only four years old, and the reason for the rapid deterioration was not apparent, although it was presumably caused by insufficient treatment.

The four cases of failure because of excessive wear were all about ten years in age, the life of one pavement having been extended from seven to ten years by relaying with a number of new blocks. Of these four cases, one pavement was reported to have been laid with tamarack blocks, although a report from another source states that "all kinds of wood" were used. In two of the other failures due to wear the pavements were laid with black gum, and the fourth was reported to have been laid with Norway pine and tamarack.

The four cases of heaving or bulging that appear in the list of failures are charged to a neglect in providing for expansion, and to the use of pitch filler which becomes hard and incapable of compression in cold weather. In addition, reports on all four cases cite the probability that the blocks were insufficiently treated, being thus permitted to absorb an excessive amount of moisture and to expand greatly.

Of the four cases of failure classed as miscellaneous, two were caused by a washing out of the sand cushions under the blocks, both being reported to have been subject to the pumping action of street railway tracks on water that seeped under the blocks from alongside of the rail. In one of these cases some of the blocks are now resting upon the bare concrete foundation, while in other

places the sand cushion is 6 in. thick. It is proposed to relay this pavement without a sand cushion, laying the blocks on ⅛ in. of asphalt supported by a mortar coating on the concrete base. This city reports that practically no repairs of wood-block paving have been needed on streets where car tracks do not exist.

Movement of street railway track is also reported as a cause of failure by another city, this movement producing leaks in the pavement surface and frost doing the rest. However, this trouble is found to occur only at cross-overs, and it is proposed to remedy the situation by using granite blocks at these points.

Of the remaining miscellaneous failures, one is due to excessive shrinkage during long dry seasons because of improper creosoting of the blocks and the use of sand filler. Another is due to sinking caused because the pavement was laid without any concrete foundation. The last instance of failure reported was chargeable to fire, the greater part of the city from which the failure was reported being destroyed in a conflagration. The committee, however, stated in its report that this could not be called an inherent defect in wood-block pavement because several instances were on record where wood-block pavements had passed through very destructive fires and were little injured. In one fire the heat was so great that overhead structural steel work was fused and fell upon a wood-block floor, but after the removal of the débris it was found that the blocks had charred only ⅛ in. to ¼ in. in depth under the direct action of the flame and from ¾ in. to 1 in. where they were touched by the fused steel. Subsequently the charred blocks were scraped and allowed to remain in service, while the blocks more deeply scarred by the hot steel were turned over and relaid. This burned floor involved perfectly normal charges for upkeep since that time.

Service Tests of Ties

The report of a committee on service tests for ties and structural timber stated in its report that primary attention had been given to ties for steam railroads. A systematic collection of data of this character has been undertaken by the Forest Products Laboratory in co-operation with this committee and with the committee on wood preservation of the American Railway Engineering Association. The general plan is for the various steam railroads to submit annually a report showing results obtained on their test tracks, which are generally used since experience has shown that tie records can be kept more accurately by the use of short sections of experimental track than by trying to keep a record of all ties on one division or the whole system. These results are classified and tabulated systematically.

With a view to securing similar data for ties used in electric railway service in the same manner, this subject has been taken up by the committee with the American Electric Railway Association. Record forms for data have been submitted and it is expected that during the ensuing year exhaustive records will be available regarding the life of ties on electric railways. The committee considers that a compilation and analysis of such data, both for ties in interurban tracks and in track on paved and unpaved streets, has not as yet received proper attention.

In addition to the service test records, which covered records from thirty-three steam railroads, the report included a statement summarizing the results obtained during the last seven years on the Chicago, Burlington & Quincy Railroad with various kinds of treatment and various species of wood. This statement represented an average of the conditions existing on twenty divisions of the railway in the states of Wisconsin, Illinois, Missouri, Iowa, Nebraska, Colorado, South Dakota and Wyoming. With regard to the various kinds of wood, the feature of the statement is the fact that practically all untreated ties, with the exception of three species; namely, white oak, chestnut and cypress, reached the end of their life in seven years. All of the ties in question were laid in the years 1909-10, and in January, 1917, something like 90 per cent of all untreated ties had been removed, this figure reaching 100 per cent in several instances. The percentage of ties removed after the seven years' service in the case of the three above-mentioned exceptions, were respectively 10 per cent, 37 per cent and 51 per cent.

The influence of treatment upon the life of ties is displayed in the following table, which is a general summary of results regardless of species of wood.

Treatment	Total Ties Placed 1909-10	Total Ties Removed Up to 1917	Per cent removed Up to Jan., 1917
Creosote	3,264	16	0.5 per cent
Card Process	15,817	455	3 per cent
Burnett Process	2,488	100	4 per cent
Untreated	3,270	2,626	80 per cent

The different treatments mentioned above include the straight creosote process, whereby creosote oil is forced into the treated wood under pressure until there is an absorption of from 5 lb. to 10 lb. of oil per cubic foot of timber. The Card process above-mentioned consists, in brief, in the use of a mixture containing about 80 per cent of zinc-chloride solution and 20 per cent of creosote, which is injected to an absorption amounting to about ½ lb. of dry zinc-chloride and 2 lb. or 3 lb. of creosote per cubic foot of timber. The Burnett process involves the use of zinc-chloride solution alone, this being applied under pressure after a preliminary vacuum until the wood refuses to absorb more, the absorption ranging between ¼ lb. and ½ lb. of dry zinc-chloride per cubic foot.

Interborough Complaint Invitation Appreciated

Posters Placed in Cars Soliciting Constructive Criticism Have Been Effective in Drawing Many Replies of a Reasonable Nature

The Interborough Rapid Transit Company and the New York Railways, New York, are receiving a large number of appreciative letters as a result of their recent appeal to the public for help in solving their transit problems, by means of posters placed in the windows of their subway, surface and elevated cars. The subway posters bear the following request:

WE ASK YOUR HELP.

Until new subway lines are opened rush-hour congestion is bound to be abnormal.

The Interborough Rapid Transit Company is trying hard to meet the emergency. We are running every rush-hour train the tracks will hold.

We ask helpful suggestions or criticisms.

Write us at 165 Broadway. All letters will receive careful attention.

THEODORE P. SHONTS,
President Interborough Rapid Transit Company.

The surface cards read:

WE ASK YOUR HELP.

Street congestion is the worst in the city's history. In our efforts to keep up good service we invite helpful suggestions, or criticisms.

Write to 165 Broadway.

Every letter will receive careful consideration.

THEODORE P. SHONTS,
President New York Railways Company.

The elevated posters read:

WE ASK YOUR HELP.

The Interborough Rapid Transit Company seeks intelligent comment or criticism of its service.

Letters sent to 165 Broadway will receive careful consideration and acknowledgment.

THEODORE P. SHONTS.
President Interborough Rapid Transit Company.

On inquiry at the Interborough offices by a representative of this paper it was learned that out of about

200 letter replies received in answer to the invitation for criticisms, a gratifyingly small proportion of them were of an unreasonable and abusive nature, whereas about 75 per cent were worded with great consideration, most of the writers prefacing their criticisms by expressing their appreciation of the excellence of this railway's service and their realization of the enormous problems with which it has to contend. The great majority of these criticisms are specific in nature and relate to suggestions for improvements in particular localities or lines personally frequented by the writer, such as having trains skip certain stops during the rush hour in order to avoid congestion and accelerate schedules, or as to the condition of toilets in certain stations, etc. Although practically all the complaints are similar in kind to those which have been registered on previous occasions, they will all be reviewed carefully, in the light of the present altered conditions of transportation.

The investigation of the complaints has been placed in the hands of a special committee, composed of two representatives of the operating department, one representative of the legal department and one representative of the president's office. Each complaint will be referred to the man in most direct charge of the matter covered, and answered as soon as possible, the reply stating whether or not the complaint had been corrected, and if not, explaining frankly the company's inability to comply.

COMMUNICATION

Standards in Car Equipment

LACONIA CAR COMPANY
BOSTON, MASS., Jan. 20, 1917.

To the Editors:

The subject of standardization for electric-railway equipment is, I think, a particularly timely one, and is of vital interest at present to car builders and railways alike. Now that it has come to the front, I trust the agitation will be kept going to its logical conclusion—a conclusion that must come sooner or later, and the sooner the better. In this the support of the ELECTRIC RAILWAY JOURNAL is a powerful leverage which cannot be overestimated.

Standardizing electric-railway car bodies appears as a very broad problem to any one who has followed the evolution since electric cars have been in use, and, although electrically-operated cars are only thirty years old, and are still in their childhood, they have undergone wonderful improvement. Nevertheless, standardization to-day has acquired vital importance in railway equipment. Any one familiar with steam-railroad standards, and knowing what they have done for the steam railroads, cannot fail to appreciate the value of the whole movement.

At the present time, the standardization of motors and trucks for electric cars takes precedence over the standardization of car bodies, and electric-railway men are busy day and night on standards for all wearing parts used on their equipments. Where the wear is heaviest, standardization has, obviously, the most importance. Therefore, the motors, motor equipment, trucks and all truck appliances subject to wear are getting the first attention.

Standardization of electric-car bodies will require the general support of railway men before anything successful can be accomplished. To-day there are a dozen different general styles of car in use all over the country, and it is safe to say that each style of car has from five to ten varieties, when one considers their design, dimensions, platform construction, seating arrangement, system of fare collection, etc., so that the field for standardizing is large.

These variations in car-body design have been brought about largely by a belief in the influence of "local conditions" existing in the city and suburbs where the cars are operating, depending upon the layout of the city with reference to its streets, parks, depots, residential locations, business districts, factory locations and suburban territories, as well as municipal rules. As such conditions differ in different cities, railway managers order cars of a type that they think is best suited for their particular requirements. In the selection of the dimensions for the various types the conditions above mentioned are also allowed to dictate, and they interfere with the ready acceptance of standards, since the railway company that is fortunate enough to have wide streets and plenty of clearance will not submit to a narrow car or a short car that might affect unfavorably the questions of capacity and comfort of passengers.

However, variations of a few feet in length are not of vital consequence. The standardization of width and bolster centers would be, in reality, more important, for as soon as we change the width of the car we must design a new cross-section, and as soon as we change the bolster centers our underframe must be redesigned. Any arbitrary dimension for height, I believe, could be readily agreed upon, except where there is overhead interference involved by passing under very low bridges or other obstructions.

What everybody is working for is to get a car that is best adapted to their particular requirements. However, aside from the peculiar needs of certain railway companies, the aim, in general, is to produce a design that gives the lightest weight consistent with durability and the greatest carrying capacity consistent with the comfort and safety of the passengers, as well as a car that can be operated with a minimum number of accidents, is cheap to maintain, and is practical for fare collection. I am of the opinion to-day that the last comer is proving to be the best car from the standpoint of the public, the railway managements, and the railway commissioners. This is the low-mounted, center-entrance design, which, I believe, will be the first and best car to commence standardizing on, as well as the simplest.

As to the standardization of structural features, it may be said that we are progressing to the extent of getting nearer together in using the same class of structural material that is available from the standard sections manufactured by the rolling mills. But in addition, a few special sections that were carefully designed and agreed upon would greatly help the builders to make lighter, stronger and neater cars.

H. DENTON WHITE,
President.

In 1916 the Pennsylvania Railroad System carried 196,294,146 passengers—the greatest number in any year of its history—without losing the life of a single one of them in a train accident. The heaviest freight traffic ever transported by any railroad was moved at the same time that these passengers were being carried safely. The entire Pennsylvania Railroad System, taking into account every affiliated company either East or West of Pittsburgh, now has to its credit three complete successive calendar years in which no passenger has been killed as the result of a train accident on any portion of its lines

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

Four Men Prominent in Public Life Are to Address Association at Midyear Dinner—Way Committee Considers Standard Spirals and Co-operation with Equipment Committee on Tread and Flange Contours

Mid-Year Meeting Dinner Speakers

At the dinner to be held in connection with the mid-year meeting at the Copley-Plaza Hotel, Boston, on Feb. 16, President L. S. Storrs will preside and the following will speak: Hon. Samuel W. McCall, Governor of Massachusetts; Hon. Warren G. Harding, United States Senator from Ohio; Hon. James M. Curley, Mayor of Boston, and Hon. Job E. Hedges, New York City.

At the meeting, as previously announced, J. D. Mortimer will present the report of the committee on social relations prepared by H. G. Bradlee, E. W. Rice, Jr., and himself; E. E. Rice, Boston, will open the discussion on this report; Bentley W. Warren, Boston, will read a paper on "Wage Arbitration and Contracts," and Robert Frothingham, New York City, will read a paper on "Salesmanship in the Electric Railway Business."

Way Committee Meets

The first meeting of the 1917 committee on way matters was held in New York on Jan. 19, 1917. C. H. Clark, Cleveland, Ohio, chairman of this committee, presided, and the following members were in attendance: A. E. Harvey, Kansas City, Mo.; E. M. T. Ryder, New York, N. Y.; W. F. Graves, Montreal, Quebec, Can.; W. R. Dunham, Jr., New Haven, Conn.; C. G. Keen, Philadelphia, Pa.; H. H. Ross, Toledo, Ohio; D. P. Falconer, Rochester, N. Y., and E. M. Haas, Cleveland, Ohio. The first subject considered was the revision of the Engineering Manual. A sub-committee of the committee on standards had made certain recommendations for condensing and eliminating extraneous matter from the Manual, and these were approved.

A sub-committee was also appointed to make final recommendations on the kind and size of bolts and fits for standard section and girder rails. In order to keep the recommended uniform method for designating compromise joints in the Manual it was approved as standard by the committee. A sub-committee was appointed to secure the approval or rejection by other committees interested of the symbols for recording surveys and the specifications for preservatives and treatment of woods which were submitted in the reports of the 1915 and 1916 way committee respectively.

L. M. Clark, Indianapolis, Ind., represented the equipment committee at this meeting in the consideration of wheel contours as they effect rail head contours. It was decided to retain the tread slope of 1 in 25 for all wheels and to submit a modified ¾-in. flange to member companies for criticism. It was the consensus of opinion that a standard flange thickness of 1 1/16 in. should be adopted to insure clearance through special work. Messrs. Clark and Ryder were appointed a sub-committee to reconcile the difference of opinion existing between the way and equipment committees in the matter of flange dimensions and contours.

Curved head rails were also considered quite fully. It was believed that the rail head should be designed to fit average worn wheels rather than to attempt at this time to adopt a wheel and rail contour which would provide a full line of contact. In order to arrive at a preliminary curved head rail section a sub-committee was appointed to obtain contours of average worn wheels from each of the properties represented by the committee members, and from as many other railways as possible, before the next committee meeting. The Brooklyn curved head rail section will also be submitted to a number of companies for criticism.

Messrs. Graves, Harvey and Ross were appointed a sub-committee to prepare a specification for built-up crossing frogs for steam and electric railway crossings.

The way committee also took up the question of recommending standard spirals. It was brought out that there were more than 250 spirals in use by railway companies, and this number could be reduced to about six. Mr. Ryder had consulted a number of the special work manufacturers on the subject of standardizing spirals and had found them in sympathy with such a move. Mr. Ryder submitted six recommended standard spirals for the consideration of the committee, and the special work manufacturers will be asked to criticise them before the next committee meeting. Before adjourning it was decided to hold the next meeting of the way committee in Cleveland, Ohio, in June.

Engineering Standards Committee

In the past the engineering associations committee on standards has contained the chairmen of the several technical committees with a view to the presentation of the points of view of these committees when their respective recommendations were under consideration. It has been decided, however, that better results will be secured by having the standards committee made up of others than the technical committee members in order that the work of the committees may be reviewed by an entirely different group. The 1917 committee is being reorganized on this basis.

Company Membership

A meeting of the manufacturers' branch of the American Association committee on company membership met in New York on Jan. 18 and planned to make an unusual effort to secure new manufacturer members before the mid-winter meeting. A list of 400 possible members was divided among the committee members.

Those present at the meeting were J. M. High, the Pantasote Company, New York City; J. H. Drew, Drew Electric & Manufacturing Company, Indianapolis, Ind.; W. K. Archbold, Archbold-Brady Company, Syracuse, N. Y.; John Benham, International Register Company, Chicago, Ill., and E. B. Burritt, New York City. Mr. Drew was designated as vice-chairman in charge of the campaign, the chairman being away on a business trip.

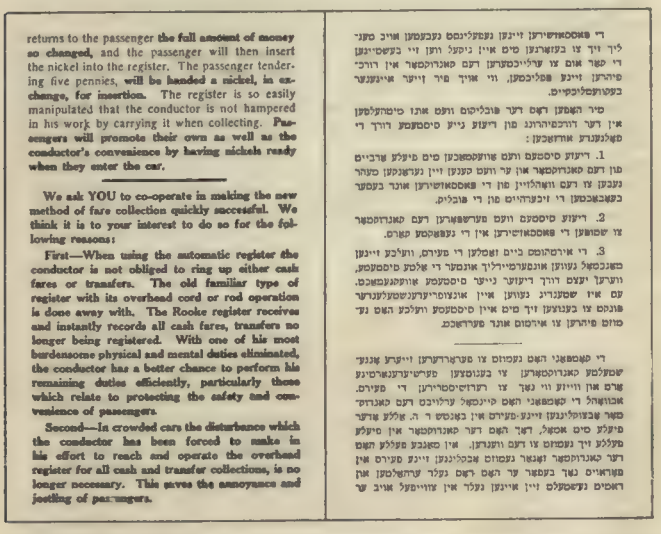
January Meeting of Denver Tramway Section

The forty-first meeting of Section No. 3 was held in Denver on Jan. 18. It was largely of a social character and more than 500 were present. Officials of the company and representatives of Denver's "Opportunities School" made addresses, and these were followed by dancing and refreshments.

B. R. T. Passengers Ring Up Fares

Automatic Coin Registers Being Used on Hamburg, Church and Ralph Avenue Lines of the Canarsie Division

IN order to enable its conductors to perform their duties more efficiently and at the same time to protect them from making mistakes the Brooklyn Rapid Transit system on Jan. 16 began the use of the Rooke automatic registers in the collection of fares on its Hamburg Avenue line. This is one of the most heavily traveled lines on the whole system, the cars during the rush hours being operated on a two and one-half-minute headway from the New York terminal of the Williamsburg Bridge. The line extends from Delancey Street, New York, over this bridge to Brooklyn and passes through a densely-traveled foreign district. Anyone familiar with this picturesque and thickly-settled section of New York knows of the congestion and heavy riding conditions. It is necessary, at times, for the conductor to bunch collections, which is contrary to the rules, and may involve either himself or the company in loss. In order to get the co-operation of the passengers



returns to the passenger the full amount of money so changed, and the passenger will then insert the nickel into the register. The passenger tendering five pennies, will be handed a nickel, in exchange, for insertion. The register is so easily manipulated that the conductor is not hampered in his work by carrying it when collecting. Passengers will promote their own as well as the conductor's convenience by having nickels ready when they enter the car.

We ask YOU to co-operate in making the new method of fare collection quickly successful. We think it is to your interest to do so for the following reasons:

First—When using the automatic register the conductor is not obliged to ring up either cash fares or transfers. The old familiar type of register with its overhead cord or rod operation is done away with. The Rooke register receives and instantly records all cash fares, transfers no longer being registered. With one of his most burdensome physical and mental duties eliminated, the conductor has a better chance to perform his remaining duties efficiently, particularly those which relate to protecting the safety and convenience of passengers.

Second—In crowded cars the disturbance which the conductor has been forced to make in his effort to reach and operate the overhead register for all cash and transfer collections, is no longer necessary. This saves the annoyance and jostling of passengers.

FACSIMILES OF PAGES FROM BOOKLETS EXPLAINING NEW B. R. T. FARE COLLECTION SYSTEM

on this line, most of whom are Jewish, four-page booklets explaining the use of the new system was printed in both English and Jewish and placed in the "Please Take One" boxes at each end of the car. A facsimile of the second page of each of these booklets is shown in the accompanying illustration. In addition, car signs directing the passengers to have their nickels ready and illustrating the method by which they should insert the coins, were posted in the car.

In order to install these registers, meetings for all the men were called, and a statement of the new system, its principles, etc., was made to the men by a representative of the Rooke Automatic Register Company. Immediately after this general meeting, which was held at Canarsie Depot, a group of conductors were advised to report for definite instructions which were given them in a car operated by two uniformed conductors in the employ of the Rooke Company. These men have operated this register for years in meeting crowded city conditions and were on the car to instruct the conductors and to answer all their questions. In order to show the men how the registers could be handled during the rush hours, they took out a heavily-loaded car on the 5.30 trip, operated the car, and collected the fares. These demonstrations were object lessons to the new men and gave them the necessary confidence to do the work well.

With this system, instead of ringing up cash fares and transfers on separate registers, the conductors extend the automatic collector and register toward the passengers, who insert their nickels in the register slot. An automatic device in the register grips the coin, pulls it in and instantly registers it, the coin then passing through a cup into the conductor's hand. When change has to be made the conductor returns the full amount of change to the passenger, who then puts the nickel into the register. In Brooklyn transfers are collected but not registered, the conductor keeping a record of the number received as heretofore.

B. R. T. Efficiency Campaign

In the efficiency campaign which the Brooklyn Rapid Transit system has been conducting, the last few bulletins to the conductors have been under the general heading of "The Company and Its Money." One of these bulletins, which was issued to the employees of the Canarsie division, contains the following:

"In speaking about your own responsibility, the management has not forgotten its responsibility to relieve you if possible, from the confusing and difficult conditions under which fares have been collected and registered in the past. A large measure of such relief the management confidently believes is presented by the introduction of the Rooke automatic register."



INSTRUCTION CARDS MOUNTED IN CAR FOR GUIDANCE OF PASSENGERS

Although there are eleven transfer points on the Hamburg Avenue line, the conductors have suffered no inconvenience and the cars are not delayed owing to the issuing of transfers or the collecting of fares at these points. Altogether, a total of thirty-seven cars are operated on this line. In the early morning hours cars are operated on a 10-minute headway; during the morning rush hours a 3-minute schedule is maintained; near mid-day the cars are operated every six minutes, and during the evening rush hours a 2½-minute headway is maintained. The normal traffic in passengers per day on this line is 29,600. Of these 19,600 are cash fares and the remaining 10,000 are transfers. The earnings per car-mile are 27 cents, but this does not give a clear idea of the density of travel because the average haul is long.

Since this automatic register was placed in service on the Hamburg Avenue line it has worked satisfactorily and the foreign-born passengers appear to be pleased with it. On Dec. 23 and 26, respectively, registers were placed in service on the Church Avenue and Ralph Avenue lines of this division and as soon as the registers arrive and conductors can receive their instructions the New Lots Avenue and other lines will also be equipped.

Short and Up-to-Date Articles on

EQUIPMENT AND ITS MAINTENANCE

Turning Commutators Concentric with Shaft Journals—Track Tools to Replace Human Horse-Power—Economies Effected in Car Lighting—Second Chart Giving Cost Data on Trolley Wire Suspension—Articles on Other Shop Methods and New Apparatus

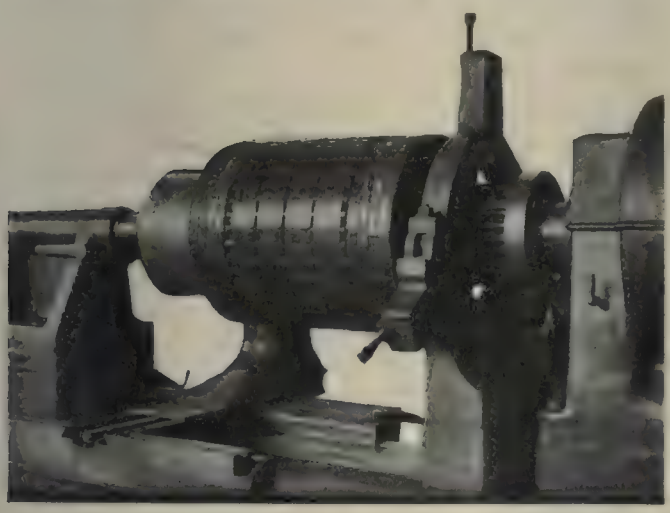
(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Getting a True Commutator

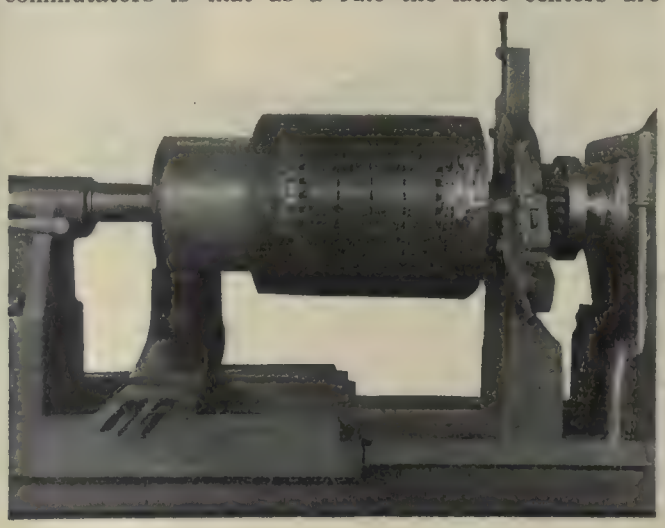
For Commutator Turning, Armatures Are Supported in Sleeve Bearings Instead of on Lathe Centers to Correspond with Service Conditions

BY R. R. POTTER
Superintendent of Equipment New York, Westchester & Boston Railway

Common practice in repair shops, whereby commutators are turned by supporting the armature between lathe centers, undoubtedly provides for a smooth commutator surface, but it does not give any guarantee that the surface is concentric with that of the armature shaft-ends, or journals, and that the commutators will run true in service. Theoretically, of course, the brush-holder springs should take up any unevenness in the movement of the commutator surface, and when the armature is rotating at slow speed, this theory applies absolutely. But when speeds of the order of 1000 r.p.m. are attained, the same thing does not hold, and though the brushes may not actually jump over the low section of the commutator surface that is brought about by a lack of concentricity with the surfaces of the shaft ends on which the armature runs, there is no question that great variation in brush pressure and liability to sparking and even flashing are produced.



STEADY-REST SUPPORT AND DRIVE AT PINION END OF ARMATURE SHAFT



ARMATURE SWUNG IN SLEEVES ON SHAFT INSTEAD OF LATHE CENTERS

The establishment of a commutator surface that is absolutely true as well as smooth is usually a difficult matter for the following reasons: In the first place, the recessed centers in the ends of the armature shaft are generally made only large enough to serve for the initial finishing of the shaft before the armature is built upon it. With the weight of the armature added, which in the case of some railway motors is as much as 2000 lb., these centers are not large enough properly to carry the load. The result is that both lathe centers and shaft centers are quickly worn out of shape, the shaft centers being not infrequently worn to one side away from the true center line of the shaft.

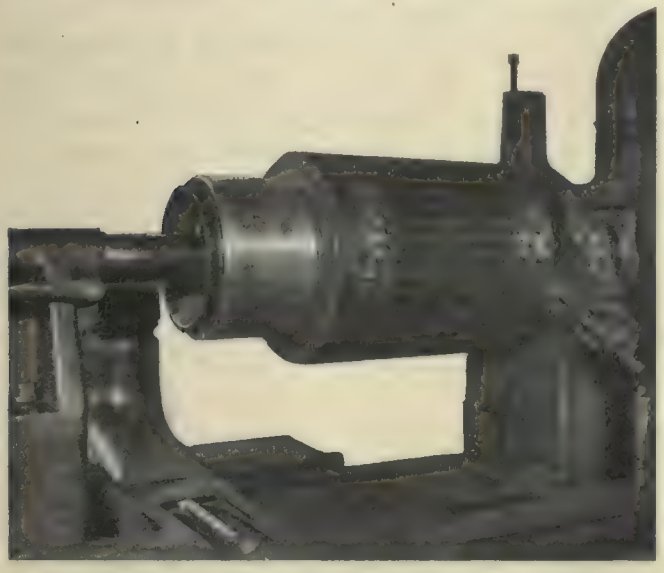
In the second place, a considerable percentage of armature shafts are more or less sprung between the pinion and the pinion-end bearing shortly after being placed in service. These slight bends are caused by reversing the motors or other incidents that bring about extraordinary strains upon the shaft. In such cases, it often happens that the shaft is not bent sufficiently to affect the proper meshing of the pinion and gear, but nevertheless the center is thrown out of line enough to influence the concentricity of the commutator when it is turned in a lathe and is swung between the lathe centers. Still another reason for difficulty in turning commutators is that as a rule the lathe centers are not kept in a sufficiently accurate condition to insure trueness of work that is turned on them. This is particularly the case when exceptionally heavy pieces such as armatures are frequently swung in the lathe and when the recessed centers on the work are under size.

To avoid the difficulties outlined above and to insure the production of a finished commutator that will run absolutely true with the journal bearings after turning, the New York, Westchester & Boston Railway has adopted in its shops the practice of turning all commutators by setting the armature shaft ends in sleeves corresponding to the armature shaft bearing, one sleeve being attached to the tailstock and the other carried in the steady-rest of the lathe in place of the ordinarily used lathe centers.

From these illustrations, it may be seen that a sleeve bearing has been slipped over the tailstock, this serv-

ing as a support for the shaft extension at the commutator end of the armature. At the pinion end of the armature, a standard pinion-end armature bearing is supported in the lathe steady-rest. This bearing in the steady-rest is first centered as accurately as possible with the armature supported between the lathe centers, after which the lathe centers are removed and the weight of the armature taken directly on the bearing. Once this steady-rest is set, there is no need to change it for turning other armatures, and the steady-rest may be left without any readjustment in setting unless, of course, other work that requires the use of the rest has to be done. The armature is driven through a short piece of bar iron attached to the face plate and engaging with the pinion teeth.

In practice it has been found that the weight of the armature is ample to make it run perfectly steady in the bearings without any tendency toward chattering, the



SLEEVE SLIPPED OVER TAIL STOCK CENTER TO SUPPORT COMMUTATOR END OF ARMATURE SHAFT

reason being, undoubtedly, that the cuts taken across the face of the commutator are invariably light and work is done on such a soft material as copper. The results in service have, of course, been very satisfactory. In the past, commutators turned in the ordinary way on lathe centers have been found to be as much as 1/16 in. out of true, and the elimination of such variations can only be desirable from an operating and maintenance standpoint. With the new method of turning, it may be said, no great necessity exists for establishing exact central positions for the bearing sleeves. If both are off center by an equal amount, the only effect will be a negligible change in the position of the cutting tool relative to the work. If one sleeve is off-center and the other is not, the result will be that the commutator surface will be turned with a slight taper, although the amount of taper will be negligible. In no case can the commutator surface be turned out of concentricity with the shaft, except where the sleeves are allowed to be so loose as to permit an appreciable movement of the shaft in a horizontal plane with the sleeves, and this, of course, can be avoided with a small amount of care on the part of the machine hand.

The armature slotter used in the Howewood shops of the Pittsburgh (Pa.) Railways is equipped with a suction blower attachment arranged so that all the copper and mica dust is drawn through a 2-in. tin pipe and deposited in a box. Considerable saving results from the reclaimed copper, and the surrounding air is kept pure.

Labor-Saving Tools for Way Department

Mobility Is an Important Element in Devices for Handling Way Materials—Tampers and Welders Are Money Savers in Maintenance Work

BY W. R. DUNHAM, JR.
Engineer Maintenance of Way The Connecticut Company, New Haven, Conn.

The article in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 23, 1916, on cutting costs in storage yards shows what may be done in the mechanical handling of material in its first stage as raw material in the railway system and in its initial start for the "job." Any economy at this point, however, may be greatly offset, if not entirely lost, in the subsequent handling to and at the location of work. While it is true, therefore, that a yard full of cranes, derricks and other appliances for the saving of labor is very desirable, the same or a greater amount of money will give better results if spent for moving units which can be used at both loading and unloading points.

As an illustration, the saving effected by the crane car mentioned in the article in the JOURNAL would have been 50 per cent less had the crane been fixed in the yard, so that the addition of wheels at least doubled the saving of the device. In other words, mobility of the equipment made it worth while.

One of the implements in the labor-saving class which is well worth considering is the electric shovel. On two jobs, not totaling 2 miles of single track, the difference in cost of excavating by hand over that of excavating by shovel was 73 per cent of the cost of the shovel, so that these 2 miles practically paid for the shovel and the rest of its work is nearly all gain. Not only was the cost of excavating cut 66 2/3 per cent, but the cost of teams was cut 50 per cent, a very desirable result when teams were not only high in cost but difficult to get. This saving was made by a green man at the shovel, and will be lowered as the operator becomes experienced.

Another help in lowering costs is one or more sets of power drills. These machines cut the costs of track work in their sphere 75 per cent over hand methods. The use of the pneumatic tampers also will show a saving not only in the actual first cost of work, but in the number of men required, in efficiency, and in time. In addition the ties are actually better tamped so that future maintenance costs are reduced.

While the use of arc welders may be overdone, there is no question but that their judicious use reduces the cost of maintenance and prolongs the life of rails and special work. Their use, of course, entails the purchase of suitable grinding apparatus. These grinders, however, are not limited to following up the welders since, in addition, they have a well-defined sphere of their own.

The article in the issue above referred to illustrated a crib for handling ties, and gave costs showing the saving made by its use. This method, however, would not give a saving unless the ties were delivered at a central yard at first. On a road where ties are received and piled by the dealer, thence hauled direct to the various jobs as needed, its use would mean a second handling and possibly duplication of equipment.

The ideal of perfect track construction has not yet been reached, nor is economy on one property necessarily an economy on another. Every road has its own distinct problems, which must be studied and met, and while a knowledge of what the other fellow is doing is a help in the right direction, an automatic following of his method will not produce the same results.

Economical Car Lighting

The Author Describes the System Used on the Cars of the Washington-Virginia Railway

BY W. A. ARMSTRONG, JR.

The changes and improvements that have been made in car lighting have resulted not only in better lighting but in cheaper lighting as well. Means for improvement that have received most attention are the use of tungsten lamps, properly designed reflectors and shades, fixtures for supporting the reflectors and lamps in such a manner as to prevent their injury as well as to insure the safety of passengers, and methods for operating headlights in a manner to eliminate the waste of power that results when the headlight is placed directly across full line potential in series with resistance. Efforts in this direction have been intended to improve relations with the public by providing cheerful, brightly lighted cars.

A typical installation recently made by the Electric Service Supplies Company for the Washington-Virginia Railway, Washington, D. C., illustrates the latest practice in car lighting. A description of the installation is given here through the courtesy of R. W. King, general manager of this railway. The company operates 64 miles of line connecting Washington, D. C., with Alexandria and Mount Vernon, Va. It is double-tracked from Washington to Alexandria and single-tracked from Alexandria to Mount Vernon, operating two-car trains at speeds up to 50 m.p.h. The conditions are not peculiar in any way, therefore the application of this car-lighting system is perfectly general.

The lighting equipment originally consisted of eighteen 23-watt lamps grouped as shown in the accompanying illustration, with an additional lamp on each platform, making a total of twenty lamps. The headlight equipment consisted of one standard 4½-amp. luminous arc, arranged with an auxiliary incandescent lamp for dimming.

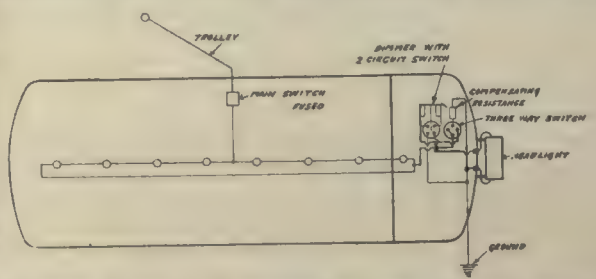
The power required for the former installation was 3160 watts, *i. e.*, 460 watts for the car lamps and 2700 watts for the headlight. Figuring the energy purchased by this company at 1 cent per kilowatt-hour for an average of five hours of night service and for 365 days per year, it is seen that the cost of power for lighting one car amounted to approximately $57.70 per year.

The redesigned lighting system for the remodeled cars consists of seven 72-watt lamps with reflectors, together with one similar platform lamp. The eight lamps are wired in two parallel circuits, each having four lamps in series, and connected in series with a Golden Glow headlight equipped with a 12-in. mirrored glass reflector and a 150-watt concentrated filament lamp.

The power required for this installation is 726 watts, the eight interior lamps requiring 576 watts and leaving only 150 watts for the headlight. The cost of lighting for the improved installation, calculated on the same basis as before, amounts to $13.25 per car per year, effecting a saving of $44.45 per year.

The safety fixtures used are of the round base, straight-pendant type, fitted with heavy-density opal glass reflectors for properly distributing the light. The fixture clamps the shade by means of flexible metal fingers to provide for expansion and contraction of the glass and to prevent rattling, as well as to cushion the reflector against severe jolts of the car.

The Golden Glow headlight, with a 150-watt lamp, provides illumination equal to the 4½-amp. luminous arc. It also gives a soft yellow beam of light for which motormen almost invariably express their satisfaction after becoming accustomed to the colored rays. For dimming the headlight within city limits, a special dimmer has been devised and application for a patent



SIMPLIFIED DIAGRAM OF REDESIGNED CAR LIGHTING CIRCUIT

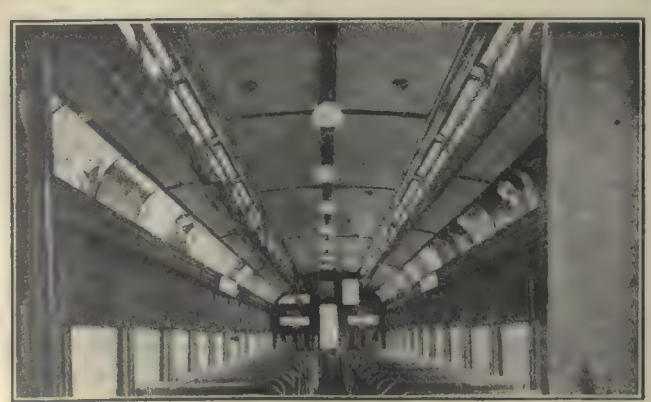
upon it has been made. By turning a snap switch the headlight is dimmed without affecting the car lamps, and also without causing a great loss of energy as in the series resistance method.

Since the laws of Washington, D. C., require that the headlight be turned out when a car stands at a terminal, these cars were each equipped with a compensating resistance equal to that of the headlight lamp which it replaces when cut into the circuit. This resistance, when used, obviously has no effect upon the interior car lamps and may be used in the circuit with them when a headlight lamp is burned out and is being replaced. In case one of the car lamps burns out, the headlight is burned temporarily in series with the remaining circuit at about one-half its usual intensity.

The cost of the installation, done while the cars were going through the shop, was about $85 per car. The average annual maintenance cost of an arc headlight is placed at $25. This amount compared with the cost of replacing two lamps for the Golden Glow headlight at $2 each shows a saving of $21, which, added to the saving in cost of power as explained above, gives a total saving of about $65.50 per year per car afforded by



INTERIOR OF CAR SHOWING FORMER ARRANGEMENT OF LAMPS



PRESENT INSTALLATION SHOWING IMPROVED APPEARANCE

the new installation. Since eight car lamps now replace twenty as used formerly, the cost of lamp renewals is reduced, especially since the larger lamps have more rugged filaments and in a vertical position are less affected by vibration. After four months in operation these cars have had no failures of either car or headlight lamps.

Economies in Track Construction Due to Equipment

Results Which Have Been Obtained with the Pneumatic Tie Tamper and the "Skull-Cracker"

BY D. P. FALCONER
Engineer of Maintenance of Way New York State Railways, Rochester, N. Y.

It is a generally admitted fact that human horsepower is the most expensive kind of power which can be purchased, and it is for this reason that any equipment or machine which will transform electric or other energy into useful work in track construction or maintenance is economical. It is with this idea in mind that this company has endeavored to equip its track gangs with such labor-saving devices as are obtainable and suitable for its use.

One of these tools is the pneumatic tie-tamping outfit which we have had in use for the past two years. We have operated this machine with a gang of five men, one operator, two ballast distributors and two tampers. The ballast distributors and tampers alternate, and in this way avoid any excessive jar or possible fatigue due to the continued use of the tamping tools. The operator is the only man in the gang who is paid more than the regular laborers' rate and we have used common labor entirely for tamping track.

We find we can tamp from seventy to ninety ties per day which, assuming twenty days to the month and six months to a year as a working season, gives us about 4½ miles of track tamped. This, of course, means new track or track which has been entirely reconstructed.

We have not obtained this record, however, with the use of our tamping outfit because we have used this outfit also for installing our riveted joints. These joints are the patented design as exhibited at the Atlantic City Convention and described in the ELECTRIC RAILWAY JOURNAL in the Nov. 4, 1916, issue, page 982. A number of other uses for compressed air have been noted in the columns of this paper and undoubtedly this method of transforming energy will find a wide variety of uses in track construction and maintenance.

Another piece of equipment which has been used by us with excellent success during the past season is what is known as a "skull-cracker." This is a pear-shaped piece of cast iron weighing approximately one ton and frequently used in junk shops and other places for breaking up old iron castings. This device was applied to the breaking up of concrete in track which was to be reconstructed. The equipment used was a small derrick operated on the track to be reconstructed after the paving was removed, and arranged with a special hook so that when the "skull-cracker" had been lifted to a height of 12 ft. or 15 ft. the trigger would release the weight and it would fall, thus shattering the concrete and making it easy for the men to pick it loose and remove it from the track. It was found that about three blows of this "skull-cracker" would break up the concrete across the track for a distance of 2½ or 3 ft. in length. Several hundred feet of concrete could be broken up in one day, resulting in a saving of from 15 cents to 20 cents per foot of single track in the labor item. In removing this concrete from the track it was piled alongside of the trench, and after the new track was laid on the subgrade the concrete was put through our portable stone crusher, which was described in your columns in the Feb. 5, 1916, issue, page 277, with the result that we were able to ballast this track with the old concrete removed, thus making a saving in ballast and also eliminating the loading and hauling of this material off the street and hauling and unloading the new material onto the street.

While it is impossible to accomplish all of these economies on all jobs, schemes of this kind can be worked out, to very great advantage and at considerable saving in cost, especially when the gangs are equipped with such tools as the above and with electric drills, welders, rail grinders, concrete mixers, etc. It is, therefore, by proper selection of equipment for each job that a saving can be made in construction and maintenance costs of electric railway work, and while each job does not give an opportunity for the economical use of all equipment, yet if gangs are equipped with a complete outfit great saving can be made by the proper planning of the work.

Data on Stoker Installation Show Low Maintenance Cost

The costs of repair parts and material for four 10-ft. x 10-ft. chain-grate stokers and their furnaces operated over a period of six years have the low values shown in the table below. It will be noted that the cost of the tile and fireclay was 85 per cent of the total material and repair part cost. The cost of replacing operating parts of the four stokers was but $8.77 per stoker per year, which is a small percentage of the present cost of such a unit, $1,800 without firebrick. The fact that in the table the 1912 cost appears rather high is accounted for by the purchase of one complete 9.5-ft. x 6.5-ft. arch and ninety large 4-in. x 12-in. x 24-in. bridge wall tile in that year at a total cost of $498.22. The data given relate to an installation of Illinois Stoker Company's chain-grate stokers in a Mid-West electric railway company's power plant.

COST OF STOKER AND FURNACE REPAIRS FOR SIX YEARS

	Cost of Repairs		
	For Stoker Parts and Iron Parts of Arch and Feed Gate	For Tile and Fireclay	Total
1910	$60.00	....	$60.00
1911	14.00	$142.25	156.25
1912	61.12	823.17	884.29
1913	40.50	67.50	108.00
1914	3.00	217.00	220.00
1915	33.25	190.25	223.50
1916	189.01	894.70	1,083.71
	$400.88	$2,334.87	$2,735.75
Total per stoker per year	$16.70	$97.29	$113.99

Flexible Conduit Used by Boston Elevated

Flexible woven conduit is being used by the Boston Elevated Railway in renewing the heating, lighting and ringing circuits and in equipping their cars with Tomlinson drawbars. The Tomlinson drawbar is constructed with insulated electric conductors forming a part of it, the terminals of these conductors being designed to make connection with corresponding terminals on the next car when the drawbars are coupled together. The wires running from the car body to the drawbar are subjected to repeated bending on account of the drawbar swinging sideways as the car turns curves, and therefore they must be run through a flexible duct. Single wall flexible woven conduit was found to be the most satisfactory for its durability and for its tendency to prevent chafing of the insulation which finally results in injury to the conductor itself.

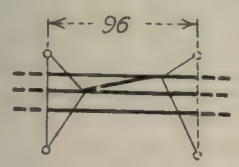
Cost of Erecting Overhead Work—II

(From the records of a large Eastern company)

The following is the second group of a series of diagrams with cost figures to show actual costs of erecting the various types of overhead construction described under conditions of light, ordinary and congested traffic. In the first group of this series, which appeared in the issue for Jan. 20, page 127, none of the figures included the cost of superintendence and engineering.

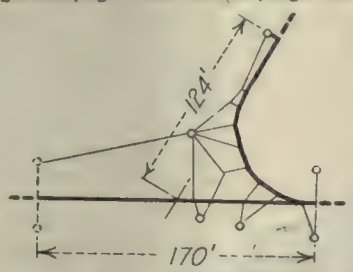
LABOR REQUIRED FOR CONSTRUCTING VARIOUS TYPES OF OVERHEAD TROLLEY SPECIAL WORK UNDER VARIOUS TRAFFIC CONDITIONS

Right-hand crossover and siding



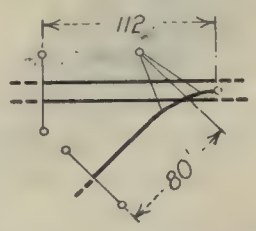
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
11	$15.95	$6.60	$19.14	$7.92	$22.33	$9.24

Single-track, right-hand branchoff, angle 120 deg.



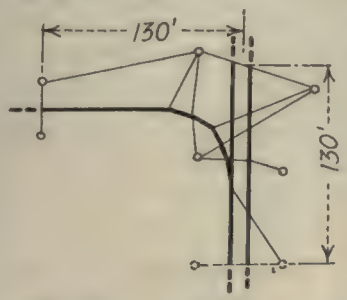
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
12	$15.95	$6.60	$20.74	$8.58	$23.93	$9.90

Single-track, left-hand branchoff, angle 45 deg.



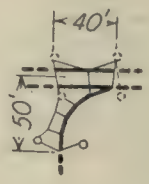
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
13	$15.95	$6.60	$19.14	$7.92	$22.33	$9.24

Single track, left-hand branchoff, from double track, angle 90 deg.



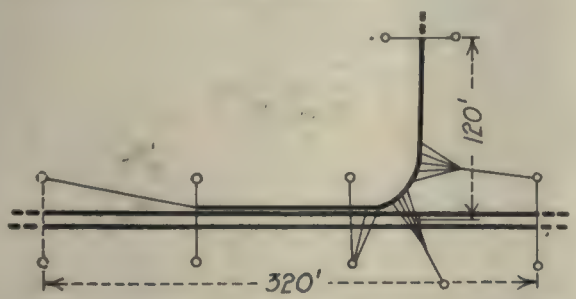
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
14	$15.95	$6.60	$19.14	$7.92	$22.33	$9.24

Single track, left-hand branchoff, angle 90 deg.



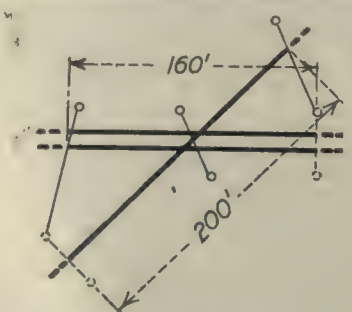
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
15	$15.95	$6.60	$19.14	$7.92	$22.33	$9.24

Single track, left-hand branchoff, to freight siding with unbroken main line connection



	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
16*	$29.04	$21.12	$36.30	$26.40	$45.38	$33.00

Single track, crossing, double track, angle 45 deg.



	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
17*	$18.15	$13.20	$21.78	$15.84	$27.23	$19.80

*Trucking includes cost of extra reel truck. None of the figures on this page include cost of superintendence and engineering.

New Anti-Friction Non-Retrieving Trolley Base

The principal feature of a new Wasson non-retrieving trolley base, for which Holden & White, Chicago, Ill., are general sales agents, is its roller-bearing mounting with an unusually large bearing area. This feature has been quite successful in extending the life of the base by preventing the wearing of pits and waves in the bearing surface. The main bearing has 120 sq. in. of area and 215 rollers, which are slightly larger in diameter than in length and are so arranged that they operate against both lateral and vertical thrust. Every sixth roller is placed on end to take up the side thrust, which is small compared with the vertical thrust. The rollers taking the latter have both a rolling and a sliding action, giving constantly shifting bearing points, which distributes the wear over the bearing surface. This action keeps the bearing surface clean, and insures good electrical connection between the upper and lower plates. The large diameter of the bearing tends to minimize the pressure upon it, insuring long life of the bearing and consequently that of the trolley base.



TROLLEY BASE SHOWING ATTACHMENT OF SPRINGS

Each roller gives a ⅜-in. line contact between the upper and lower bearing surfaces of the raceway, which is 13 in. in diameter, and the rollers form the current path between the movable and stationary parts. The over-all height of this base is 5 in. and it weighs 100 lb., the construction being similar to the retrieving base of the same make. The current cable can be attached to any one of the four lugs, making a very accessible connection.

By attaching the springs to the pole more than 2 ft. from its fulcrum point, the makers secure a quick spring action, which tends to prevent the dewiring of the wheel at uneven places in the wire. The opposite ends of the springs are located in such a position, relative to the pole fulcrum, that an increase or decrease in spring tension, due to the movement of the pole, is overcome by a change in the length of the power arm to produce a uniform force at the wheel. This tends to prevent the wheel from leaving the wire where it is high, as for instance at railroad crossings.

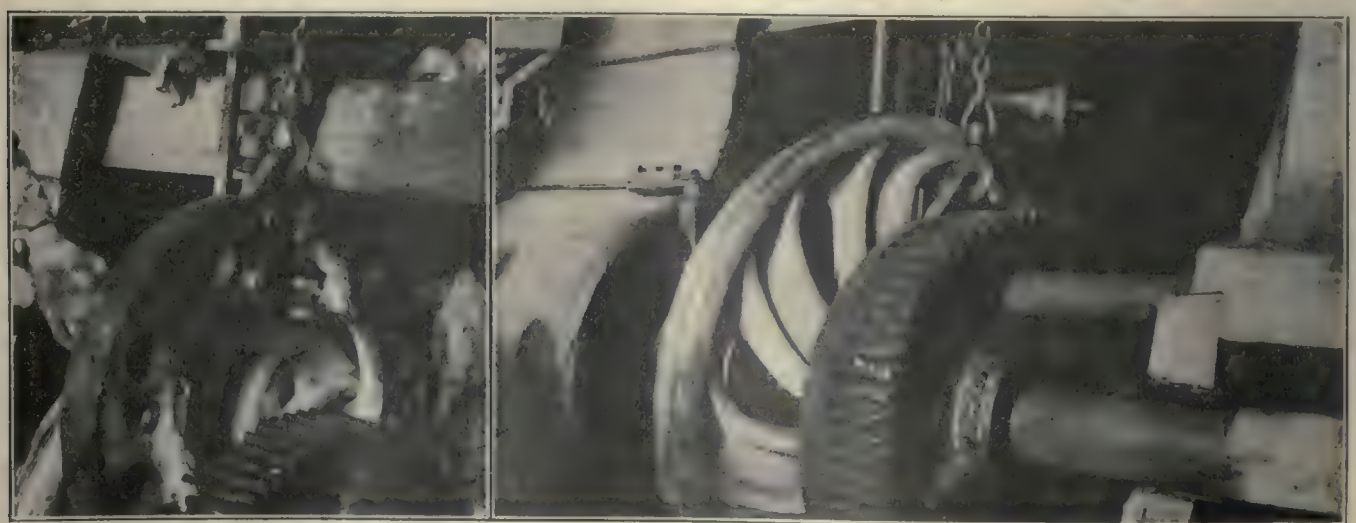
In case the trolley pole leaves the wire and "throws over" beyond a certain point, the springs are brought into tension again, and serve to check the motion of the pole as it approaches a vertical position. This is accomplished by means of an extension lug which forms an integral part of the spring hook, and engages the main base as the pole goes beyond its highest working position. The travel of the hook is thus limited and a line of spring tension at a new angle to the pole is established, thus virtually shortening the springs. If the trolley wheel leaves the wire at a low position and the rope breaks, the springs gradually bring the pole to rest after it passes a certain position, thereby obviating the damage to the equipment which might result if the pole is stopped suddenly.

Pressing Off Car Wheels

A method has been devised by M. B. Osborne, master mechanic Galveston Electric Company, for pressing off a car wheel when a gear is on the axle adjacent to the wheel. The device consists of a steel collar 26 in. in diameter and 3½ in. thick. It was made from a flange coupling taken from a shaft which was a part of an old steamboat equipment.

As seen in the photograph the flange was simply cut in two and then the two halves were hinged to provide a means of support in handling. The large holes shown in the collar were originally provided to fasten together the flanges of the coupling, and though not used for any purpose now are advantageous in making the device lighter. Two rods, used to press off the wheel, are passed through holes in the gear and are held firmly in place by means of the small holes shown in the collar. These small holes are so arranged that the rods may be set and held in place whether the gear has three or four holes, thus making the application of the device general.

This device is very inexpensive and convenient. The split flange is lowered into place by means of a chain block and fastened around the axle, the rods are set in place and the wheel is quickly pressed off.



LOWERING COLLAR INTO PLACE ON CAR AXLE—COLLAR AND RODS IN POSITION FOR PRESSING

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

Chicago Committee Hears Railways

Mr. Busby States Position of Companies on Subway Commission Report — Enabling Legislation Necessary Before Progress Can Be Made

At a meeting of the local transportation committee of the Chicago City Council, Jan. 22, which was attended by Samuel Insull, Henry A. Blair, Britton I. Budd, Leonard A. Busby, Gilbert E. Porter, and other electric railway officers, Alderman Henry D. Capitain, chairman of the committee, called upon Mr. Busby to state the position and attitude of the companies with respect to the report of the Chicago Traction & Subway Commission.

MR. BUSBY'S PLEA

Mr. Busby confined his remarks principally to the franchise consideration upon which depends the practicability of the subway plan. The physical plan recommended by the commission appealed to him. The crux of the whole plan, however, was the franchise arrangement. On this the commission made no definite recommendation. Mr. Busby estimated that between $275,000,000 and $300,000,000 will be required to carry the scheme to completion. This can be raised only through a sound financial plan based on a satisfactory franchise. According to Mr. Busby there was no use to proceed with the discussion of any other phase of the plan until after the franchise matter was settled. It was generally conceded that legislation was necessary to enable the city to grant a franchise for more than twenty-five years, to make possible the unification of the elevated and surface line companies. It would be impossible to raise the money with a twenty-year grant as a basis. The City Council should formulate its policy and take steps at once to secure the legislation desired if anything was to be accomplished at the present Legislative session.

The commissioners report outlined a terminable, or as it is more generally known an indeterminate, franchise as one of two possible plans of financing the undertaking. Mr. Busby believed that the terminable franchise offered the only other satisfactory agreement which would serve all interests to the best advantage. The terminable franchise might in effect become perpetual, but there could be no cessation of the operation of the cars, and this implies a continuation of service under term franchises renewed under a new terminable franchise. As long as the terminable franchise under the proposed plan gave control of the property to the city, the objections to the perpetual grant were entirely outweighed by its advantages.

PROBLEM LARGELY FINANCIAL

Mr. Insull said that the problem was purely a financial one, and included the financing of about $500,000,000 of new securities divided about half and half between construction work and refunding of existing securities. In order to raise this sum of money, a basis of financing must be provided by which it can be secured cheap. The investment must eventually come out of the pockets of the people who ride, and it was to the city's advantage to devise the most economical way to finance the work. The terminable franchise was best suited to this.

Several aldermen objected to the terminable franchise because of its perpetual aspects. A resolution was then passed directing Walter Fisher, the committee's special counsel, to draw up a resolution for discussion which would cover the several points of enabling legislation necessary, and include the shortest definite-term franchise under which it would be possible to carry out the commissioners' plan. In this connection Mr. Blair said that he was certain nothing under fifty years would be considered by the men to whom it would be necessary to look for financing the proposition.

Court Against United Railroads

Injunction to Prevent Paralleling of Tracks by Municipal Lines Denied by Judge Hunt of United States District Court

San Francisco's right to lay railway tracks upon city streets without regard to existing franchises held by private companies was upheld in a decision by Judge William H. Hunt in the United States District Court at San Francisco on Jan. 18. The decision denies the United Railroads an injunction preventing the city from building parallel tracks along Market Street from Kearny to the mouth of Twin Peaks tunnel.

The suit for the injunction was filed by the United Railroads last June and a temporary restraining order was granted, after the city had begun laying a crossing of the United Railroads' tracks at Van Ness Avenue and Market Street, to extend the Van Ness Avenue line out Market Street to Church. The case was argued before Judge Hunt in August and was finally submitted on Oct. 14.

HOW CITY OFFICIALS INTERPRET ORDER

The decision is interpreted by city officials to mean that the municipality may build its own lines along any streets within the city limits whether or not these streets are occupied by the tracks of a private corporation. Pending further litigation the city understands that it has a wider latitude than that which was accorded rival traction companies by the Legislature when one company was granted the right to use the tracks of another for a maximum distance of five blocks. The decision says:

"It is accepted that the destruction of the franchise is not possible; but even so, in the complexity of modern society new conditions present themselves which may call for the safeguarding of the public interests in a way which justified the application of the doctrine that the police power may extend to all great public needs.

"It is very important to note that words of direct expression or intention to grant an exclusive franchise are not to be found in the instrument itself (the franchise) nor does it appear that exclusiveness was a positive consideration for the contractual obligation nor is there any expression by apt words to show that the city intended to exclude itself from exercising the privilege of establishing a street railway of its own. No deliberate purpose to make a surrender of exclusive rights appearing, I accept the more reasonable interpretation of the language used, and regard the franchise as not conferring such exclusive rights as against the city."

DECISION BASED ON KNOXVILLE CASE

The court based its decision largely upon the Supreme Court decision in the Knoxville water case. In that case the city of Knoxville had granted an exclusive franchise to the water company to supply the city with water, but the Supreme Court held that this did not bar the city from going into the water business, although it did exclude competition by a private company. In short, in the San Francisco decision the court ruled that the right of a municipality to those privileges which it grants to private corporations by a franchise cannot be forfeited or lost.

It is believed the United Railroads will appeal first to the United States Circuit Court of Appeals and then to the United States Supreme Court at Washington on the ground that the laying of parallel tracks practically confiscates its franchise, which is a property right, and is thus a violation of the United States Constitution.

Immediately after the decision city officials decided upon the following construction program:

1. Construction of the Church Street line from Sixteenth

and Church Streets to Van Ness Avenue and Market Street.

2. Double tracking from Van Ness Avenue and Market Street to Twin Peaks Tunnel.

3. A double-track line from Van Ness Avenue and Market Street to Kearny and Market Streets, giving through connections from Sloat Boulevard to the ferries.

Item 1 will be undertaken first. The funds for this connecting link, amounting to $110,000, have already been appropriated and it is expected that the work can be completed within three months. Other features of the proposed construction program will bring the total cost up to $442,000.

Tacoma Relief Petition Heard

Company Seeks to Have Gross Earnings Tax and Paving Requirements Rescinded

The hearing relative to the petition of the Tacoma Railway & Power Company to be relieved of certain franchise provisions was held before the Public Service Commission of the State of Washington in Olympia, on Jan. 15. The company asks that the tax of 2 per cent on gross earnings and the obligations to pave streets both be rescinded. It contends that reduced earnings have made it impossible to fulfill the obligations of the franchise without jeopardizing the utility. The case came before the commission on an objection interposed by the city of Tacoma to the jurisdiction of the State Board.

City Attorney U. E. Harmon, of Tacoma, made the principal argument for the municipality, contending that the commission is not empowered to afford relief to the company from its contractual obligations with the city. Attorney James B. Howe, for the company, argued that the commission has jurisdiction and can abrogate franchise obligations.

OTHER CITIES REPRESENTED

Owing to the importance of the hearing to municipalities of the first class, the cities of Seattle, Spokane, Bellingham and Everett had representatives present. Issues argued were based on a motion to dismiss raised by Mr. Harmon on grounds that the company seeks to abrogate franchises which have all the force and effect of contracts and that the only relief possible is through the courts. Jurisdiction of the commission over any function of public utility operation, other than as to regulation of fares and service, was denied. Hugh M. Caldwell, corporation counsel of Seattle, maintained that under the present law the public utility companies which feel that they can not meet contract obligations must obtain relief through the Legislature or surrender their franchises. Walter F. Meier, for Seattle, maintained that while the Public Service law has invested the commission with police power over rates and service, it has excluded broader powers of jurisdiction from the commission, and that these remain with the city.

THE COMPANY'S ARGUMENT

Mr. Howe, for the company, argued that as the statute places the company under commission regulation, in all particulars of operation, and limits its charges to a 4-cent fare within the corporate boundaries of a city, at the same time guaranteeing to it a fair return on money invested in return for adequate service, power is thereby conferred upon the commission to remove any franchise restrictions that make it impossible for the company to live up to conditions imposed by the State in establishing commission regulation. In support of its petition to be relieved of a gross earnings tax of 2 per cent imposed in Tacoma, street maintenance expense and other contributions, the company submitted a statement showing a deficit of $218,000 from Tacoma operations.

At the close of the arguments the commission took under advisement the contentions raised by the cities of the State against the commission assuming jurisdiction over public utility franchise conditions. If the commission decides to assume jurisdiction, a hearing will be held and evidence taken on the company's claim that it can no longer furnish adequate service and meet the contract conditions at the statutory fare, within the limits of an incorporated city.

Cost of Living Discussed

Company in Portland, Ore., in Striking Treatment Compares Cost-of-Living Nickel with the Street Car Nickel

The Portland Railway, Light & Power Company, Portland, Ore., published in the annual edition of *The Morning Oregonian* of that city, dated Jan. 1, a full-page advertisement, headed "A Study of the Cost-of-Living Nickel *vs.* The Street Car Nickel." The text was divided under the heads "The Cost of Living" and "The Street Car Ride," there being one paragraph under the former and three under the latter head. On the cost of living the company said:

"The unprecedented increase in the cost of the necessities of life in recent years, and particularly in the past year, has become a national problem and is engaging the attention of the Federal Government. It is estimated that the purchasing power of the nickel has been virtually cut in two in the last thirty years and that the reduction in its purchasing power has been about 40 per cent in the last twelve months."

At the right-hand side of this statement was printed "5c.," under the dates 1886, 1915 and 1916, to show by their relative sizes the shrinkage in purchasing power of the nickel in buying things to eat and wear.

The first paragraph devoted to the street car ride follows:

"In 1886 you could ride a distance of only 2.75 miles in one of Portland's old horsecars for a single 5-cent fare. Transfers were unknown in those days, at least in Portland. In 1916 you can ride a distance of 18.7 miles for the same 5-cent fare, or practically seven times as far as you could thirty years ago, thanks to our long suburban lines and universal transfers."

At the right-hand side of this statement was printed "5c." under the dates 1886 and 1916, to show by their relative sizes the comparative length of the car ride in Portland thirty years ago and to-day.

The second paragraph devoted to the street car ride follows:

"While it is rather difficult to make exact comparisons as to the saving of time spent riding to and from your work nowadays as compared with the days of the old, slow, easy-going horsecars, a fair estimate is that the average street car patron saves fully two-thirds of the time formerly consumed in that manner."

At the right-hand side of this statement was printed "5c." under the dates 1886 and 1916, to show by their relative sizes the comparative speed or time-saving element of the old horse car and the modern trolley car.

The third paragraph devoted to street car rides follows:

"There has been a substantial increase in the comfort, safety and convenience of street car patrons in the past thirty years, due to better roadbed, better ventilation, heating, lighting and seating facilities of the modern electric cars as compared with the ancient horse car. Probably 100 per cent would not be an overestimate of the improved facilities and comforts in the past thirty years."

At the right-hand side of this statement was printed "5c." under the dates 1886 and 1916, to show the relative comfort, convenience and safety to passengers to-day and thirty years ago.

The fourth paragraph devoted to street car rides follows:

"There has been a tremendous increase in the cost of everything entering into the production of the street car ride in recent years. Material, labor, equipment and supplies of all kinds have substantially advanced in cost. A very conservative estimate based on the experiences of electric railways generally is that this increase will average fully 50 per cent, considering all items."

At the right-hand side of this statement was printed "5c." under the dates 1886 and 1916, to show by their relative sizes how the cost of producing the 5-cent car ride has increased in three decades.

The advertisement was concluded with this statement:

"Since Jan. 1, 1907, and up to and including Nov. 30, 1916, this company has carried the enormous total of 810,363,205 persons on its cars without the loss of the life of a single passenger."

International to Spend $1,000,000

President Connette Announces That Fifty Cars Will Be Purchased and Other Expenditures Made

More than $1,000,000 will be spent in improvements within the next six months by the International Railway, Buffalo, N. Y. Edward G. Connette, president of the company, announces the company will purchase fifty new cars of the front and rear entrance and center-exit type. These will be used on the city lines. The thirty-three cars which were destroyed by fire in the Cold Spring and Broadway carhouse last year have been replaced with the exception of eleven, which are now being rebuilt in the company's Cold Spring shops. Other old-type cars, which have been out of service for some time, are being rebuilt and repaired by the company.

The 10,000-hp. steam turbine ordered by the company a year ago will be delivered in February and will probably be in service in the Niagara Street power house early in March. This will relieve the shortage of power experienced by the company since the embargo was placed by the Canadian Government on the exportation of Canadian-Niagara power to western New York.

In an effort to relieve the congestion at the big industrial plants in North Elmwood Avenue, where almost 12,000 workers board cars between 5:30 and 6 o'clock every night, the company is considering the construction of a substation near this district where passengers can board cars after passing through gates where fare collectors would be stationed. Pending the construction of such a loading station, the company will lay a double-track line in Elmwood Avenue, from Hertle Avenue to the city line. A franchise for this extension was granted at the last municipal election. Construction work will start in the spring. This track extension will be used for storing extra cars to handle the rush-hour crowds from this rapidly growing industrial district.

Among other improvements the company will extend the new Bailey Avenue line from Clinton to Seneca Streets. The line from Broadway to Clinton Street has been in operation about a month. The Bailey Avenue line has also been opened between East Ferry and Genesee Streets. The Broadway line between Jefferson Street and Fillmore Avenue will be rebuilt and improvements will be made in the roadbed of other lines.

$600,000 Spent in Indianapolis

Money Used for Improvement of Lines and for New Equipment

The Indianapolis Traction & Termial Company, Indianapolis, Ind., during the year 1916 spent more than $600,000 in the improvement of its lines and in purchase of new equipment. The 1916 improvements may be grouped into four classes, viz.: Track elevation, flood prevention, down-town re-routing and track construction and rehabilitation. Under the head of track elevation there appears special work at Illinois and South Streets, and on Kentucky Avenue at South and West Streets. At the crossings on South Street the tracks were spread and the crossing improved. Under the head of flood prevention is classed the improvements on Oliver Avenue, Kentucky Avenue, Morris Street, West Michigan Street and West Washington Street, these improvements being of a varied nature and designed to adapt the car system to the flood prevention work being carried on in the city of Indianapolis and to supplement that work. Following the policy of the company to install permanent construction work wherever new paving is required, the company has reconstructed a great deal of track in connection with orders for paving of the part of the street which it occupies. The re-routing of the cars in the down-town district necessitated special work at Market and Alabama Streets, Alabama and Washington Streets, Delaware and Washington Streets, Meridian and Maryland Streets, Indiana Avenue and West Street, and Indiana Avenue and Blake Street. The re-routing also required the building of 625 ft. of double track with granite paving on Alabama Street from Market to Washington Streets and 2400 ft. of double track with granite paving from West to Blake Streets on Indiana Avenue.

Buffalo Strike Award

Verdict in Favor of Company Includes Only Actual Property Damage

Only actual property damage was included in the verdict returned in the Supreme Court of Erie County in favor of the International Railway, Buffalo, N. Y., against the county for alleged failure to protect the company's cars during the street car strike riots in the spring of 1913. The verdict was for the nominal sum of $2,862. The company brought suit for $108,000, which included $14,000 a day loss in receipts during the strike period. The jury returned a verdict of no cause of action on this part of the complaint. An appeal will probably be taken to a higher court by Norton, Penney, Spring & Moore, of counsel for the railway company.

In his testimony before the jury, E. G. Connette, president of the International Railways, declared that nearly all fares collected by the strike-breakers brought to Buffalo to take the places of the striking platform men, were held by the men and not turned over to the company, so that the company received little revenue during the strike period. Counsel representing the company contended that the county was responsible for the company's earnings because of its alleged failure to provide adequate protection, although two regiments of the New York National Guard were doing strike and riot duty. The verdict was referred to briefly in the account of the trial which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 20, page 131.

Progress on Kansas City Terminal

Station to Be Ready in Sixty Days Involves an Expenditure of $100,000

The new freight terminal for Kansas City, Mo., which is under construction at Fourth and Wyandotte Streets, will be completed in sixty days according to present indications. The site and building will involve an expenditure of $100,000. They will provide the only facilities in the city for the handling of interurban freight and express packages. The small freight depots now maintained by the various lines that enter Kansas City will be abandoned, all but one company, the Strang line, having signed a thirty-year contract to handle their freight and express matter through the Kansas City Interurban Freight Terminal Company, These roads have contracted to supply a minimum annual tonnage of 31,000 tons. The companies that have entered into this contract are the Kansas City, Clay County & St. Joseph Railway; the Kansas City, Kaw Valley & Western Railway; the Kansas City Western Railway and the Kansas City, Lawrence & Topeka Railway. The terminal company is incorporated for $100,000 and the officers are: John H. Rockwell, president; William S. Tuley, vice-president; Adolph J. Meyer, secretary and treasurer.

EXPANSION OF FREIGHT BUSINESS

Already there are indications that other proceedings will be undertaken to expand the freight business by the electric lines of the district and probably to provide connections with the steam roads. There is, it is said, a possibility that such connection can be made within a block or so of the interurban freight station; but if this cannot be accomplished, connections will be arranged for elsewhere, without doubt. Another problem that is being studied is that of deliveries of freight in the cars, as brought to the city by interurban or electric locomotive, to their destination within the city limits.

There are many instances on record, of cars consigned to Kansas City houses, that could be brought to the city limits by interurban, and delivered to the warehouses without disturbing the contents. In practice, these cars must be unloaded at a freight station, and the freight hauled by motor truck or horse-drawn vehicles to the consignee, at great cost and great waste of time. While no announcement of plans can be made now, it is said to be probable that the connection with the belt steam railroad, and the provision for delivering freight cars in the city and suburbs, may both be brought about this year.

Maryland Commission Reports

The Public Service Commission of Maryland on Jan. 19 made public its report to Governor Harrington for the year 1916. The total capitalization of the corporations under the commission's jurisdiction is $1,611,892,725. Transportation Expert Bruce W. Duer calls attention to the fact that during the year all cars in service on the lines of the United Railways & Electric Company, Baltimore, Md., were equipped with improved protecting fenders, automatic wheel guards, proper destination signs and signal bells. He also states that 560 cars of the semi-convertible, open-platform type were converted into modern vestibuled cars.

Under the heading "Accidents" Mr. Duer reports that 146 persons were killed and 8490 were injured on steam and electric railways within the State in 1916. Of the killed, 107 were of the public and 39 were employees. Of the injured 2102 were employees and the remaining 6388 were of the public. On steam roads 78 of the public and 35 employees were killed and 144 of the public and 852 employees were injured. On the electric lines 29 of the public and 4 employees were killed, while 6244 of the public and 1250 employees were injured.

The transportation expert states that the number of motor cars or jitneys in public use in Baltimore decreased materially during the year, but that there has been no decrease in the number of jitneys in the counties.

"Home-Rule" Bill for Chicago

A special legislative committee, headed by Medill McCormick, which has made a survey of the utilities in Illinois presented a proposed "home-rule" bill for Chicago to the State Legislature on Jan. 23. It is intended to restore control over Chicago public utilities to the City Council. The method of exerting this control by the City Council is not specified, although the bill which accompanies the report suggests two schemes. The first of these contemplates control through a commission to be appointed by the Mayor, while the second provides control through the City Council direct, with power vested in it to create a commission or commissions by ordinance. The bill is called a measure to restore home rule to all cities having a population of 200,000 or more, but Chicago is the only city in Illinois with the defined population.

Relief Sought in California

F. W. Webster, general manager of the Fresno (Cal.) Traction Company, discussed the problems of the electric railways in that State in an interview in the Fresno *Republican* of Jan. 3. Mr. Webster said that the electric railroads of California were operating under burdensome and out-of-date laws and that the State Legislature would be requested this session to relieve the companies of some of their obligations so that capital could be induced to invest in electric railways and thereby make needed extensions. He was quoted in part as follows:

"The last year has been most disastrous in earnings of our company, but we, of course, feel that the next year is going to make a great change and through the public sense of justice the electric roads will receive a square deal. Otherwise the future is very dismal indeed. It is true that during the past year we have not earned interest on the investment in this city.

"You cannot secure capital for extensions unless you can show a paying investment or a possibility of making it such. We cannot do this for the local lines or other lines. The electric roads of California will ask for relief from a law passed in 1876 which required the roads to pave between their tracks and on 2 ft. on each side of the tracks. That is asking too much of us under the present conditions, as our earnings are cut and the traffic now goes on our part of the pavement, as cars are stationed at the curbs. We pay 5¼ per cent of gross earnings to the State, and our other taxes bring the total amount paid by us to the public authorities to 12 per cent. We cannot continue to perate under such a burden."

Strike Declared Off.—The strike of motormen and conductors employed by the Allegheny Valley Street Railway, Tarentum, Pa., declared on Aug. 15, 1915, has been called off, according to announcement of the executive committee of the strikers. During the strike the former employees of the company operated jitney buses.

Wheeling Employees Seek Wage Increase.—The union employees of the Wheeling (W. Va.) Traction Company have asked for an increase in wages. They desire 30 cents an hour for the first six months, 32 cents an hour for the second six months, 34 cents an hour for the third six months, and 36 cents an hour after eighteen months continuous service, during the life of the contract.

Gary Franchise Negotiations Fail.—The efforts have failed which were made toward securing a new franchise for the Gary & Interurban Railroad in Gary, Ind., referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 6, page 50. The segregation of the properties and a share in the net profits was proposed to the city in return for the repeal of the present franchise ordinance fixing the local fare at 3 cents.

Nine-Hour Bill in Maine.—A bill has been introduced into the Legislature of Maine which provides that no street railway and no person, firm, corporation or other employer operating a street railway shall require any conductor or motorman to work more than nine hours in any day and if any such conductor or motorman shall work nine hours or less in any day such work shall be performed within eleven consecutive hours.

Hearing on New York Central Improvements on Feb. 14.—Public hearings are to be held commencing on Feb. 14 on the "form of agreement" reached between representatives of the city of New York and the New York Central Railroad for the improvement and electrification of the company's West Side lines in New York, as made public on Jan. 16 and referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 20, page 130.

Cincinnati Commission Approves Steps Taken on Local Matters.—The Rapid Transit Commission of Cincinnati, Ohio, has approved all steps so far taken by the conference committee in revising the street railway franchise and in dealing with the Cincinnati Traction Company. A financial report submitted showed that of the $100,000 appropriated at the beginning of the preliminary work of building there was a balance on hand of $65,089.

Waterfront Bus Line for San Francisco.—On recommendations of the public utilities committee, the Supervisors of San Francisco, Cal., have adopted a resolution accepting the proposal made by the State Harbor Commission to pave a strip adjacent to the sea wall for a length of several miles and to give to the city exclusive right to operate motor buses over the same. Upon the completion of the pavement the city and county are to provide the necessary means of transportation.

$15,000,000 Tunnel for Baltimore.—Representing an outlay of approximately $15,000,000, the Pennsylvania Railroad on Jan. 24 submitted plans for the improvement of its terminal facilities at Baltimore, Md., to Mayor James H. Preston for the consideration of the municipal authorities and the City Council. One of the main features of the plans provides for the construction of twin tubes paralleling generally the present tunnel under the city. No mention is made of electrification of the terminals, one of the points upon which the city has insisted.

Strike Suits Withdrawn.—The Wilkes-Barre (Pa.) Railway moved on Jan. 19 to lift the injunction obtained several months ago against all the striking carmen, many of whom are now back at work. The injunction restrained picketing and prevented the men from interfering with passengers or the service of the company. The company also asked for damages and filed with the injunction claims similar to those in the Danbury hatters' case. According to the terms of the strike settlement as published in the ELECTRIC RAILWAY JOURNAL of Dec. 23, page 1312, the company agreed to stop all court actions, to lift the injunction and to withdraw the claims for damages.

Directory of Public Service Companies of Pennsylvania.—In the State of Pennsylvania, 496 street railways hold charters of incorporation, according to a directory of public

service companies in that State just issued by the Public Service Commission. Of these companies, 120 are actually operating their own properties; 250 are operated by other companies holding leases on the properties and lines; 109 have never performed the functions for which they were chartered, and seventeen are "dormant," having ceased to perform their functions as companies. The directory shows 3715 utility companies under charter in the State, including railroad, gas, heat, light, telephone, telegraph companies, etc.

Proposed State Tax for Municipal Railways.—In its annual report the California State Board of Equalization said: "There seems to be no reason why the municipally owned utility should not bear its just proportion of a State tax. It is manifestly unfair for San Francisco and Los Angeles to take over a public utility without paying to the State the amount of taxes which would ordinarily accrue under private ownership. To do so creates a great liability for a deficiency in the State's revenues, and if resort is had to an ad valorem deficiency tax an unwarranted burden is cast upon the people of the State who do not live in the cities concerned. We recommend the enactment of a law by which the municipalities owning and operating public utilities shall be required to report to this board and pay a tax commensurate with the State's other taxpayers."

City Departments Not Permitted to Favor Other Departments.—In a written opinion by the attorney general's office of the State of Washington it is contended "that a city has no power to require one public utility to loan money to another department unless the current rate of interest is charged; that a city has no right to require a utility to furnish free service or service below the usual cost to other utilities or municipal departments; that a city council has no power to appropriate, directly or indirectly, any part of the income or surplus of one utility for the benefit of another utility." The bureau of inspection of public offices had asked the attorney general whether or not it was legal for a municipally-operated utility to receive as a gift from the general fund of a city a contribution for the purpose of providing working capital or for covering a deficit. In direct answer to the question the opinion is quoted: "We know of no provision in the statute which prohibits a municipally-owned public service from receiving a gift from any source. We are of the opinion, however, that the city authorities cannot make such a gift as that referred to in this instance."

Programs of Association Meetings

Arkansas Association of Public Utility Operators

The 1917 convention of the Arkansas Association of Public Utility Operators will be held at Pine Bluff, Ark., on May 16, 17 and 18.

Wisconsin Electrical Association

The annual meeting of the Wisconsin Electrical Association will be held at the Hotel Pfister, Milwaukee, Wis., on March 15 and 16. The program has not as yet been definitely arranged.

American Institute of Electrical Engineers

The dinner-dance of the American Institute of Electrical Engineers will be held at the Hotel Astor, New York, N. Y., on Feb. 16 at 7 p. m. The purpose of the dinner-dance is to provide a popular and informal social function for the entertainment of the members and their guests in attendance at the mid-winter convention of the institute.

Southwestern Electrical & Gas Association

The Southwestern Electrical & Gas Association has chosen Dallas, Tex., as the place for holding its annual convention on April 26, 27 and 28. The program of papers is now being arranged. The Electric Club of Dallas has already begun the work of making arrangements for the entertainment of the delegates. At the last meeting of the club a committee consisting of L. C. Bradley, chairman, W. J. Drury, Fred Slater, W. L. Marshall and H. S. Cooper was appointed to arrange the details of the entertainment.

Financial and Corporate

Blue Sky Laws Upheld

United States Supreme Court Decides That Ohio, Michigan and South Dakota Security Sale Laws Are Constitutional

The so-called blue sky laws of Ohio, Michigan and South Dakota, regulating the sale of securities, were upheld as constitutional by the Supreme Court on Jan. 22 in far-reaching decisions affecting similar laws in twenty-six States. Justice McKenna handed down the opinion of the court, to which Justice McReynolds alone dissented. The Justices admit that such statutes may curb and burden legitimate business, but hold that the interests of legitimate business are not paramount to the police power of States to protect their citizens from fraud. Federal Court injunctions suspending enforcement of the laws are dissolved.

The laws give State authorities, through security commissions or banking superintendents, authority to forbid the sale within State borders of securities which officials believe would result in fraud upon investors. The court said:

"The statutes burden honest business, it is true, but burden it only that under its forms dishonest business may not be done. Expense may thereby be caused and inconvenience, but to arrest the power of the State by such considerations would make it impotent to discharge its functions. It costs something to be governed."

The blue sky laws of Ohio, South Dakota and Michigan all had been held unconstitutional by lower Federal courts, and their enforcement by State officials was enjoined while the officials appealed. Two principal points upon which these acts were declared void and non-enforceable in the lower courts were: That they unduly burdened interstate commerce, of which stocks, bonds and other securities were declared to be instrumentalities, and that the laws exceeded the States' police powers of local supervision.

The States, however, contended that the laws prevented fraud only, and, unlike the original Kansas type of blue sky legislation, did not attempt to prevent unwise investments. Also, they contended that the laws did not restrict or burden interstate commerce, applying only to sales within the States, and in preventing frauds they were normal and wise exercise of police power.

Another San Francisco Circular

Statement by Committee Headed by J. H. Hammond Announces Reasons for Opposing Reorganization

The committee, of which John H. Hammond of Brown Brothers & Company, New York, N. Y., is chairman, has issued another circular to the holders of the 4 per cent bonds of the United Railroads, San Francisco, Cal., and to the holders of deposit certificates issued for the bonds under the reorganization plan dated Sept. 22.

It is set forth in the circular that the surplus net earnings over the total interest requirements for the underlying, as well as the 4 per cent bonds, would, under usual conditions, make a readjustment or reorganization unnecessary. It is stated that reorganization in this case is caused by other than insufficient income. Sacrifice of capital by the 4 per cent bondholders required by the present plan is declared to be unnecessary.

The Hammond committee announces that it had opposed the reorganization, namely, the expiring franchises, and the lessly large sacrifice by the bondholders which it represents without adequate compensation; failure of the plan to provide for the difficulties which form the occasion for the reorganization, namely, the expiring franchises, the necessity of refunding the debt and properly refinancing the company. With respect to the matter of financing, it is claimed that the plan does not provide for extensions, improvements and other capital purposes, such as are constantly necessary in a rapidly growing community.

Annual Report

Interborough Consolidated Corporation

The income statement of the Interborough Consolidated Corporation, New York, N. Y., for the year ended Dec. 31, 1916, follows:

Surplus, Dec. 31, 1915		$1,834,090
Income:		
Dividends on Interborough Rapid Transit stock (20 per cent)	$6,782,560	
Other dividends and interest	122,876	
Profit on purchase for retirement of $2,500,000 of Interborough-Metropolitan ten-year 6 per cent collateral gold notes	25,920	
Total		$6,931,356
		$8,765,446
Deductions:		
Interest on $67,825,000 of Interborough-Metropolitan 4½ per cent collateral trust bonds	$3,052,125	
Interest to July 1, 1916, on $2,500,000 of Interborough-Metropolitan 6 per cent collateral gold notes	75,000	
Interest at 4½ per cent on $2,000,000 advance from Bankers Trust Company, from July 1, 1916	46,000	
Sinking fund on above 4½ per cent bonds	300,000	
Sinking fund on above 6 per cent notes	150,000	
Administration and general expenses	43,619	
Taxes	128,395	
Total		$3,795,139
Surplus available for dividends		$4,970,307
Dividends on preferred stock, 6 per cent		2,774,430
Net surplus		$2,225,877
Appropriation for retiring above 6 per cent notes in excess of sinking fund accruals		350,000
Surplus balance, Dec. 31, 1916		$1,875,877

The gross revenue of the subsidiary subway and elevated lines for the six months' period ended Dec. 31, 1916, notwithstanding the strike, increased approximately $2,193,000. The earnings on the surface lines fell off on account of the strike, but they are said to be gradually nearing normal.

The Interborough-Metropolitan Company ten-year 6 per cent collateral gold notes, dated Jan. 1, 1915, of which there were $2,500,000 outstanding on Jan. 1, 1916, were retired during the year. For that purpose the company secured on July 1, 1916, from the Bankers Trust Company, an advance of $2,000,000 for nine months at 4½ per cent interest, the balance required for the purpose of the retirement being taken from surplus cash.

Under authority of a resolution of the board of directors whereby the sum of $300,000 was directed to be set aside out of the annual income of the company for the acquisition of the 4½ per cent collateral trust bonds of the company as a sinking fund, there was acquired in the open market bonds to the amount of $2,510,000.

During 1915 a favorable opportunity seemed to be presented to bring to a conclusion the protracted litigation arising over the funds in the hands of the Metropolitan Street Railway and the New York City Railway receivers. After six months' negotiations, matters were brought to such a state that on Feb. 15, 1916, an order was entered providing for the discharge of the receivers, and the receivers were actually discharged on March 24. As a result, the New York Railways and its affiliated companies became entitled to recover approximately $4,200,000. Of the fund thus acquired, $950,000 was employed in carrying off a real estate mortgage upon fee property of the New York Railways and $650,000 in paying a general obligation contracted by the Metropolitan bondholders' reorganization committee.

Fiscal Years to End Dec. 31

The Massachusetts Public Service Commission has ordered returns from utilities subject to its jurisdiction to be filed for fiscal years ending Dec. 31 instead of June 30, in accordance with action already taken by the Interstate Commerce Commission and by other State commissions. Returns for the year ended Dec. 31, 1916, are due March 31, 1917.

The State Public Utilities Commission of Illinois has issued an order permitting the utilities of the State to change the date of the annual report from a termination on June 30 to a termination on Dec. 31.

Electric Railway Statistics

Returns for October, 1916, Compared with Those for the Corresponding Month of 1915, Show Menace of Growing Expenses

A comparison of electric railway statistics for October, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicates a menacing growth in the expense burden. This is further intensified by the unsettled labor conditions in New York City. Indications point, however, to an encouraging improvement in the business conditions of the Western district. Data for October, representing 7259 miles of line of companies scattered throughout the country, show a decrease in operating revenues of 1.15 per cent, an increase in operating expenses of 5.58 per cent and a decrease in net earnings of 10.93 per cent. Data representing 6150 miles of line indicate an increase in the amount of taxes paid of 5.32 per cent, and a decrease in operating income of 14.75 per cent.

Of the three groups shown in the accompanying table, data for the Eastern, represented by 4359 miles of line or approximately 60 per cent of the total mileage, show a decrease in operating revenues of 3.64 per cent, an increase in operating expenses of 6.35 per cent and a decrease in net earnings of 17.65 per cent. Returns representing approximately 80 per cent of this mileage show an increase in the amount of taxes paid of 7.11 per cent and a decrease in operating income of 22.43 per cent. Though labor conditions in New York City in this month were constantly improving, they were still somewhat unsettled and their effect upon the earnings and expenses of the lines in the metropolitan district and consequently upon those of the Eastern district was still somewhat felt.

The Southern group, represented by 760 miles of line, is apparently beginning to feel the effects of the increasing cost of labor and materials. Though the earnings in October increased 2.22 per cent, an increase in operating expenses of 5.70 per cent caused the net earnings to decrease

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR OCTOBER, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
*United States**	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$16,258,463	†1.15	$15,219,913	†1.73
Operating expenses	10,285,255	5.58	9,643,522	5.08
Net earnings	5,973,208	†10.93	5,576,391	†11.64
Taxes	.....	....	1,030,076	5.32
Operating income	.....	....	4,546,315	†14.75
Operating ratio, per cent:				
1915	63.26	....	63.36	....
1916	59.23	....	59.25	....
Miles of line represented	7,259	....	6,150	....
*Eastern District**				
Operating revenues	$10,778,413	†3.64	$10,445,889	†4.06
Operating expenses	6,945,155	6.35	6,744,721	5.95
Net earnings	3,833,258	†17.65	3,701,168	†18.21
Taxes	.....	....	692,208	7.11
Operating income	.....	....	3,008,960	†22.43
Operating ratio, per cent:				
1915	64.44	....	64.57	....
1916	58.38	....	58.45	....
Miles of line represented	4,359	....	3,759	....
*Southern District**				
Operating revenues	$813,235	2.22	$504,674	1.50
Operating expenses	478,808	5.70	289,767	4.84
Net earnings	334,427	†2.40	214,907	†2.68
Taxes	.....	....	40,752	†3.59
Operating income	.....	....	174,155	†2.46
Operating ratio, per cent:				
1915	58.88	....	57.42	....
1916	56.93	....	55.59	....
Miles of line represented	760	....	506	....
*Western District**				
Operating revenues	$4,666,815	4.49	$4,269,350	4.14
Operating expenses	2,861,292	3.76	2,609,034	2.94
Net earnings	1,805,523	5.68	1,660,316	6.08
Taxes	.....	....	297,116	2.61
Operating income	.....	....	1,363,200	6.87
Operating ratio, per cent:				
1915	61.31	....	.....	....
1916	61.75	....	.....	....
Miles of line represented	2,140	....	1,885	....

†Decrease.

*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

2.40 per cent. Data for companies represented by approximately 85 per cent of such mileage indicate a slight decrease in the amount of taxes paid and one of 2.46 per cent in the operating income.

Returns for the Western district show an increase in operating revenues of 4.49 per cent, in operating expenses of 3.76 per cent and in net earnings of 5.68 per cent. Data for companies represented by approximately 90 per cent of this mileage show an increase in the amount of taxes paid of 6.08 per cent, while the operating income increased 6.87 per cent.

The operating ratio is growing, that of the United States in October having increased from 59.23 in 1915 to 63.26 in 1916. Similar increases are apparent in the Eastern and Southern districts, while the Western shows a slight decrease, though its operating ratio is the highest of all.

Progress of California Utilities

Electric Railway Showing Comparatively Poor—Details of New Financing During Year

The year 1915 was the most prosperous year in the history of public utilities in California, although the electric railways in the State were not so fortunate. The total operating revenue of all the utilities, including the entire business of the interstate railroads, which was not segregated by them, was $384,617,734. The operating expenses amounted to $249,303,932, leaving net operating revenue of $135,313,802 for the year. These figures are for the calendar year ended Dec. 31, 1915, for all public utilities except the transportation lines, and for the fiscal year ended June 30, 1915, for steam railroads and electric railways. They are taken from the report of the California Railroad Commission for the year ended June 30, 1916, just available.

Statistics compiled by the commission for each class of utility show that the net operating revenue in each case was greater in 1915 than in 1913 or 1914 with the exception of steam railroads and electric railways. In the case of the former, however, there has lately been a large increase in net operating revenue, so that the record for the last fiscal year will show up better than the one for the year preceding. For electric railways, however, the outlook seems not so favorable. The operating revenue of $33,869,392 for the year ended June 30, 1915, was a decrease from $36,108,649 in 1914 and $36,077,841 in 1913. The operating expenses of $23,250,018 in 1915 were a slight decrease from those of $23,986,694 in 1914, and were greater than those of $22,983,578 in 1913, while the net operating revenue for 1915 was only $10,619,373 as compared to $12,121,955 in 1914 and $13,094,262 in 1913. The report of the commission states that the decrease in net operating revenue was no doubt caused to a considerable extent by jitney buses, but the commission formerly denied that it had any jurisdiction over such carriers.

Under a recent court ruling, however, the commission must control their rates and service when the jitneys are not operated solely within a municipality.

During the fiscal year ended June 30, 1916, the commission passed upon $242,523,095 of securities desired to be issued by public utilities, as compared to $134,271,268 during the preceding year. Of this total $231,644,870 was granted. Of the securities authorized 65.56 per cent represented stocks, 27.83 per cent bonds, 4.24 per cent notes and 2.37 per cent certificates of indebtedness. During the last fiscal year the electric railways made application for new securities totaling $28,713,194, of which $6,973,102 was authorized, including $126,000 of stock, $4,184,000 of bonds and $2,663,102 of notes. An analysis of the purposes for which new securities were authorized shows that for electric railways the $126,000 of stock was for additions and betterments. Bonds were issued as follows: Additions and betterments, $405,000; refunding, $125,000, and collateral, $3,654,000. Of the note issues $472,873 was for additions and betterments, $2,129,209 for refunding and $61,020 for collateral. To consider the new securities authorized as a whole, there were $1,003,873 for additions and betterments, $2,254,209 for refunding and $3,715,020 for collateral.

Jitney Securities Authorized

The Public Service Commission for the Second District of New York has established a precedent by authorizing the Carpenters' Bus Line Company of Watertown, a jitney line, to issue and sell at par 320 shares of its common stock, the proceeds to be used in the purchase of equipment and general development.

American Railways, Philadelphia, Pa.—Bioren & Company and Newberger, Henderson & Loeb, Philadelphia, Pa., announce that they have purchased $1,750,000 new 5 per cent collateral trust bonds of the American Railways, issued for the purpose of retiring part of the $2,500,000 of Scranton gold trust certificates, which the American Railways elected to purchase at 102½ and interest on March 1. Holders of the certificates may deposit same and receive in exchange for each maturing bond an interim certificate for one of the new bonds of the American Railways and $50 in cash, together with $25, the amount of the April 1 coupon.

Chicago City & Connecting Railways Collateral Trust, Chicago, Ill.—Harrison B. Riley, chairman of the board of the Chicago City & Connecting Railways Collateral Trust, has issued a statement reviewing the affairs of that company and dealing with the investigation of transit affairs in that city by the Chicago Traction & Subway Commission, the report of which body has been reviewed at length previously in the ELECTRIC RAILWAY JOURNAL. In that part of his statement dealing with the direct affairs of his company Mr. Riley said in part: "It is a matter of congratulation that the trust has been able to pay the full preferred dividend accruing during the last half of the year 1916. This is due to an increase of 10 per cent in the gross earnings of the Chicago surface lines during the first ten months of the fiscal year, and also to the economical management of these properties. The operating ratio is materially lower than last year. It must be remembered, however, that the continuance of the present situation will depend upon a normal increase in gross receipts, and the ability to maintain a favorable operating ratio."

Georgia Railway & Power Company, Atlanta, Ga.—When the three financial petitions of the Georgia Railway & Power Company and the Georgia Railway & Electric Company came up for hearing before the State Railway Commission on Jan. 16, after having been postponed for a week, Marion Jackson, representing the opposition, moved for another postponement. This the commission denied. The sessions of the commission on Jan. 16 completed the hearings upon the petition of the Georgia Railway & Power Company to issue scrip, and the petition of the Georgia Railway & Electric Company to issue bonds. The petition of the Georgia Railway & Power Company to issue bonds will be taken up when the commission resumes the hearing. E. H. Rollins & Sons, Boston, Mass., are offering at 93 and interest, to yield about 5.45 per cent, $500,000 of first and refunding mortgage 5 per cent bonds of the Georgia Railway & Power Company.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Indianapolis Traction & Terminal Company has issued $125,000 of 5 per cent car trust certificates, Series E, dated Dec. 1, 1916, and due in semi-annual installments from June 1, 1917, to Dec. 1, 1926, the amounts due on Dec. 1, 1918, 1920, 1922, 1924 and 1926 being $7,000, all other installments $6,000. Interest is payable in July and December at the office of the Pennsylvania Company for the Insurance on Lives & Granting Annuities, Philadelphia, Pa., the trustee. The certificates cover twenty-five double-truck closed motor cars complete, operated under lease that has been assigned by the Indianapolis Traction & Terminal Company to the trustee.

Niagara Gorge Railroad, Niagara Falls, N. Y.—Mrs. Melodia Blackmar Jones, widow of the late Capt. Joseph T. Jones, president of the Niagara Gorge Railroad, Niagara Falls, N. Y., was elected a member of the board of directors of the company, at a stockholders' meeting. She will succeed Captain Jones. Other directors elected were Bert L. Jones, George C. Riley, Whitney G. Case, William H.

Hotchkiss, C. M. Bushnell, William W. Riley, C. M. Whitthauser, O. E. Foster, K. B. Hansard, Buffalo, and C. L. Corliss, Tonawanda, N. Y. The new board of directors will meet on Feb. 2 to elect officers and Mrs. Jones will probably be elected president of the company to succeed her husband.

Northern States Power Company, Chicago, Ill.—By action of the board of governors of the New York Stock Exchange the issue of $18,000,000 of first and refunding, twenty-five year, Series A, 5 per cent bonds of Northern States Power Company, dated April 1, 1916, has been listed on the exchange.

Sapulpa Electric Interurban Railway, Sapulpa, Okla.—The Salpulpa Electric Interurban Railway has been incorporated in Oklahoma with a capital stock of $200,000 as the successor to the Sapulpa & Interurban Railway, a 12-mile electric railway bought in under foreclosure by the bondholders on Sept. 9, 1916.

Standard Gas & Electric Company, Chicago, Ill.—H. M. Byllesby & Company, Inc., Chicago, Ill., are offering for subscription at 96 and accrued interest to net 6⅜ per cent, $200,000 of 6 per cent gold notes of the Standard Gas & Electric Company dated Oct. 1, 1915, and due Oct. 1, 1935. The notes are in coupon form in the denomination of $1,000, $500, $100 and $50. The total authorized issue is $15,000,000. Of this amount there are now outstanding $6,914,250 of the notes, this sum including the present offering.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—Through the Empire Trust Company, St. Joseph, Mo., the St. Joseph & Savannah Interurban Railway has called for payment at 102½ and interest on April 1, 1917, all its first mortgage bonds. The company will be merged with the St. Joseph Railway, Light, Heat & Power Company and proceeds for the redemption of the bonds were secured by a sale of first and refunding 5 per cent bonds of the St. Joseph Railway, Light, Heat & Power Company.

Texas Traction Company, Dallas, Tex.—J. F. Strickland, Dallas, Tex., president of the Texas Traction Company and the Southern Traction Company, which are to be consolidated according to an agreement already reached, has returned to Dallas from Chicago, where he was called in connection with final details of the consolidation plans. Mr. Strickland said the consolidation agreement would be referred to the stockholders of the two lines at a meeting to be held in Dallas at an early date. Arrangements for the consolidation were well under way previously, but had to be abandoned for the time being owing to the discontinuance of the business of one of the financial houses participating.

West End Street Railway, Boston, Mass.—The West End Street Railway has sold to Curtis & Sanger, F. S. Mosely, and Blodget & Company, Boston, Mass., $2,700,000 of 5 per cent five-year bonds, callable in August, 1919, at 102 and interest. The bankers are offering the bonds at 101¾. The proceeds of the new issue are to be used to retire a like amount of bonds due on Feb. 1, 1917, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 20, page 136.

Wheeling (W. Va.) Traction Company.—It is stated that the Wheeling Traction Company proposes to issue $40,000 of 5½ per cent equipment trust certificates for the purchase of eight new pay-enter cars to cost $43,698. The certificates are to mature serially over a period of five years.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway has filed a petition with Massachusetts Public Service Commission to issue $240,000 of 4½ per cent gold bonds in order to retire an issue of $200,000 of twenty-year 4½ per cent mortgage bonds of the Worcester & Blackstone Valley Street Railway and $40,000 of bonds of the Uxbridge & Blackstone Street Railway assumed by the Worcester Consolidated Street Railway when these companies were taken over. The Worcester Consolidated Street Railway has also petitioned the commission to be allowed to cancel 33,750 of its total of 69,260 common shares, par $100, and issue 45,000 shares of first preferred stock, cumulative at rate of 5 per cent per annum.

Dividends Declared

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Brazilian Traction, Light & Power Company, Toronto, Ontario, quarterly, 1 per cent, ordinary.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, common and preferred; one-half of 1 per cent, common, payable in common stock.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Grand Rapids (Mich.) Railway, quarterly 1¼ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly 1½ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred.

Philadelphia (Pa.) Rapid Transit Company, $1.25.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred.

Railway & Light Securities Company, Boston, Mass., 3 per cent, preferred; 3 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov.,		'16	$18,680	*$8,527	$10,153	$3,540	$6,613
1 "	"	'15	17,671	*8,946	8,725	2,204	6,521
12 "	"	'16	209 545	*102,128	107,417	41,623	65,794
12 "	"	'15	189,924	*109,375	80,549	25,823	54,726

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Nov.,		'16	$8,507	*$9,769	†$1,262	$1,116	†$2,378
1 "	"	'15	7,872	*7,763	109	1,103	†992
12 "	"	'16	121,971	*108,246	13,725	13,278	447
12 "	"	'15	115,133	*96,205	18,928	13,525	5,403

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Dec.,		'16	$1,570,819	$20,310	$1,550,509	$314	$1,550,195
1 "	"	'15	532,195	17,789	514,406	40,833	473,573
12 "	"	'16	10,110,342	239,389	9,870,953	258,961	9,611,992
12 "	"	'15	4,479,800	172,856	4,306,944	490,000	3,816,944

DALLAS (TEX.) ELECTRIC COMPANY

1m., Nov.,		'16	$181,900	*$109,220	$72,680	$40,695	$31,985
1 "	"	'15	161 525	*98,789	62,736	34,067	28,669
12 "	"	'16	1,959,837	*1,205,992	753,845	446,828	‡326,359
12 "	"	'15	1,846,739	*1,114,800	731,939	402,090	329,849

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Nov.,		'16	$73,859	*$38,362	$35,497	$9,622	$25,875
1 "	"	'15	71,405	*33,823	37,582	8,715	28,867
12 "	"	'16	820.296	*440,086	380,210	107.245	272,965
12 "	"	'15	709,292	*382,517	326.775	105,163	221,611

EL PASO (TEX.) ELECTRIC COMPANY

1m., Nov.,		'16	$99,883	*$56,104	$43,779	$5,269	$38 510
1 "	"	'15	93,481	*44,009	49,472	4,187	45.285
12 "	"	'16	1,094,844	*645.869	448,975	57,972	391.001
12 "	"	'15	988,805	*517,508	451,297	50 378	400,919

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Nov.,		'16	$170.144	*$106,885	$63,259	$36,824	$26,435
1 "	"	'15	168,260	105,554	62,706	36,710	25,996
12 "	"	'16	1,931,555	*1,232,696	698,859	438,731	260,128
12 "	"	'15	1,965,151	*1,202,237	762,914	432,921	329,993

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Nov.,		'16	$26,089	*$14,468	$11.621	$5.241	$6,380
1 "	"	'15	22,845	*12,909	9,936	5,523	4,413
12 "	"	'16	323.507	*183,470	140.037	64.197	75,840
12 "	"	'15	271,259	*159,269	111,990	66.601	45,389

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Nov.,		'16	$48,375	*$35.394	$12,981	$15,508	†$2.527
1 "	"	'15	49,250	*35,856	13,394	14.725	†1,331
12 "	"	'16	618,511	*422 330	196,181	183,091	13,090
12 "	"	'15	614,092	*430,540	183,552	176,350	7,202

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Nov.,		'16	$731,630	*$432,984	$298,646	$184,682	$113,964
1 "	"	'15	643.822	*403.103	240,719	182,573	58,146
12 "	"	'16	8,018,193	*5,092,698	2,925,495	2,210.477	715.018
12 "	"	'15	7,577,430	*4,755,539	2,821.891	2,175,308	646,583

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Nov.,		'16	$74,794	*$46,031	$28,763	$23,706	$5,057
1 "	"	'15	66,448	*43,138	23 310	23,121	189
12 "	"	'16	814,900	*548,318	266,582	282.098	†15,516
12 "	"	'15	796,988	*519,795	277.193	278,583	†1,390

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

International Railway Attacked

Unusually Heavy Fall of Snow and Consequent Delays Seized Upon for Newspaper Campaign Against Company

Attacks which have been made upon the International Railway of Buffalo, N. Y., and its officers and directors during the last few weeks by a large afternoon daily newspaper have been repudiated by municipal and State authorities. The Buffalo City Council refused to approve the application of the Commissioner of Public Health, who recommended the enactment of a ludicrous health code which would govern sanitary conditions in the company's city cars. In its campaign the paper took advantage of traffic delays on all city lines caused by unusually heavy falls of snow and other abnormal weather conditions. The charges, however, have apparently had little effect upon the public because of the company's policy of giving the widest newspaper and other publicity to the causes for traffic delays, etc.

COMPANY ASKS FOR CRITICISMS

On the second day of the campaign against it the railway published a large display advertisement in the daily newspapers urging the public to send constructive criticism to President Connette, personally, and in other advertisements causes of traffic and other delays were given and some newspapers published lengthy news articles containing favorable interviews with E. J. Dickson, vice-president, and other officers of the company in which all of the various charges made against the company were answered and the public was asked for their support and co-operation in making suggestions for improvements in service.

Urged by this newspaper, the Commissioner of Public Health drafted a code of health laws which provided for the arrest of all platform men in charge of overcrowded street cars; that every passenger more than six years old must be provided with at least 4 sq. ft. of floor space; that the temperature in cars at all times must be at least 50 deg. Fahr., that the standing room in all cars shall be limited to one-half its seating capacity and that 350 cu. ft. of fresh air shall be provided for each passenger each hour. When the code was presented to the City Council it was suggested that it be placed on the table. This is considered as tantamount to its rejection as unfair to the company.

COMPANY IMPROVEMENTS

President Connette told the Buffalo correspondent for the ELECTRIC RAILWAY JOURNAL that never before has the company been making more active efforts to improve service and traffic conditions on its Buffalo lines. Miles of new copper wire were strung during the fall so as to prevent wire breakage during the winter storms, new car lines have been extended in several sections of the city, the new Bailey Avenue line has been placed in partial operation so as to handle employees at several East Side industries; new cars have been bought and placed in operation and other old cars have been rebuilt so as to improve the rolling stock; hundreds of additional platform men have been employed to handle rush-hour loads more efficiently; more frequent schedules are being maintained on all lines and numerous other improvements have been made within the last few months to improve service and traffic conditions.

Mr. Connette has directed that special signs be displayed on all cars leaving the industrial district in North Elmwood Avenue so that these extra cars will be for the sole use of employees of these plants. In an effort to relieve congestion on Main Street between Seneca and Allen Streets during the evening rush hour, the company will lay double tracks in Franklin Street between Chippewa and Allen Streets, and many lines now using the city's main traffic artery will be diverted through a parallel street. A franchise for the Franklin Street extension was approved at the last municipal election.

In replying to the complaint of insufficient heat during cold weather, Mr. Connette in a signed statement to the public says:

"Until March 1, when the new steam turbine is installed in the Niagara Street power station, the company will keep one point of heat turned on at all times, except during the peak load when it will be impossible. Three points of heat on three cars requires enough energy to operate two cars and during the rush hour the movement of cars, we believe, is more important. After the power shortage is relieved we will keep one point of heat turned on, and more, as the weather warrants. One point of heat will raise the temperature in a car about 25 deg."

An inspector will be placed in each carhouse by N. H. Brown, general superintendent of transportation, to supervise the cleaning of all cars. Each carhouse is now in charge of a foreman, who has charge of the cleaning, inspection and repairs and whose duty it is to see that cars are properly cleaned and kept in repair, but in order to facilitate this work Mr. Brown will employ an additional inspector at each carhouse.

On Jan. 23 the informal complaints of twelve residents of Buffalo to the Public Service Commission were consolidated by that body into one formal complaint, and it was announced that following a survey of conditions in Buffalo by Charles R. Barnes, electric railway inspector of the commission, public hearings will be held by the commission.

The company has issued for general distribution several different pamphlets setting forth its position and answering the questions directed at it in criticism of its service.

Increase in Business in Kansas City

A Pleased Public Responds to Company's Efforts with Liberal Patronage

Officials and employees of the Kansas City (Mo.) Railways have been pleased to note the gain of about 7 per cent in business during the ten and a half months since the Kansas City Railways succeeded the Metropolitan Street Railway. Although the community has grown, this alone would not account for the gain of almost $500,000 in receipts over the same period of the previous year, for the number of automobiles in the city has almost doubled. The only feasible explanation seems to be in the fact that the public is a pleased public. For the first time in years the street railway has not come in for any general condemnation by the public. The present management has considered the public demands openly, and where these demands had a measure of justice they have been granted. Since the present management took hold there have been no secrets. There have been the usual number of private conferences, but the public has always been answered truthfully, and every complaint has been honestly investigated. If a request could not be granted the real reason was given. All this has brought about a more kindly feeling toward the company than ever existed before—a kindly feeling that shows up in the dollars poured into the company's treasury a nickel at a time.

Throughout the year the people have been told that the company was spending more than $100,000 monthly among Kansas City business concerns; that nearly $300,000 monthly went for labor; that $75,000 monthly was spent for fuel, and that more than $1,000 a month went to the city water department for water alone. Added to this the people were told from time to time of the arrival of new cars, a total of seventy-five having been purchased at a total cost of $450,000. When the year was finished the people were told through the newspapers that 9.01 miles of new extensions had been built, and that 16.71 miles of old track had been reconstructed at a total cost of more than $1,000,000.

The management feels that it is partly the doing of these things that brought a more kindly feeling and helped to increase the business. Every piece of literature put out for the purpose of building up travel told of these things.

In discussing the future at the beginning of the new year, President Philip J. Kealy said:

"It has been a splendid ten and a half months. In that time we have kept in advance of the public, but each of us should remember that the public is always on the jump, and if we go to sleep the public will catch up with us. So let's keep on keeping ahead."

Spokane Traffic Case Decided

Owl Service to Continue—One-Man Cars Sanctioned —Consolidation Suggested in the Interest of Economy

The Public Service Commission of the State of Washington has decided that the Washington Water Power Company and the Spokane & Inland Empire Railroad, Spokane, shall continue the owl car service on their lines and that before they operate one-man cars in Spokane they shall submit to the commission for approval lists of routes on their respective lines upon which they desire to operate such cars and that such cars be inspected and approved by the commission before operation. The decision to this effect was rendered by the commission on Jan. 10 in the case of the City of Spokane against the companies mentioned, which came up for hearing on June 9.

CITY'S COMPLAINT

The city alleged in substance that for a long period of time the companies operated owl cars from the center of the city at about 12.30 a.m.; that many persons patronized these cars and to have such service discontinued would be a serious inconvenience; that the respondents were reconstructing cars and operating them with one employee; that there were a number of complaints that the cars were dangerous and the service inadequate and that the public was not properly protected in the operation of the cars.

COMPANIES' DENIAL

The companies denied that it would be a serious inconvenience to the traveling public to have the owl car service discontinued; that the operation of the one-man car was not dangerous or the service inadequate, and that the public was properly protected in the operation of the cars. They also pointed out that the construction and operation of their lines had not been confined to the business and thickly settled portion of the city, but had been extended to the suburbs and into thinly settled districts and that in consequence of the marked decrease in patronage due particularly to the increased use of the motorcycle, private automobile and competition of the jitney, the lines were operated at a loss and that the conditions affecting transportation in Spokane were such that they were compelled to resort to every possible means of effecting economy and reducing the cost of conducting transportation.

OPINION OF COMMISSION

In its opinion the commission said that the testimony in the case showing the financial condition of the companies reflected the true condition. It was not reasonable to presume that the stockholders would long continue to operate properties in which they not only did not receive any return on their investment, but actually suffered a loss. If no relief were found from such conditions "the trolley will come down and the rails will come up." This would be especially true in outlying districts and the commission did not know of any power that it possessed "to compel a public service company to continue to discharge its functions to the public under such conditions." With this condition in mind the commission realized the necessity of using its efforts to preserve to the public a reasonably safe and efficient service without unduly throttling the activities of the carriers in their efforts to operate their systems with the greatest economy. With reference to the owl cars the opinion of the commission was that this service could not well be discontinued without serious inconvenience to a considerable number of patrons, and that to discontinue it would result in only a comparatively small saving to the companies in operating expenses. On that account it felt that the service should be continued. With reference to the near-side stop or one-man cars the commission was of the opinion that the one-man cars could be operated with greater convenience to the public and in some respects greater safety than the cars having a rear entrance and stopping on the far side of a street; and that where cars were not too large and the traffic not too congested they could be operated with reasonable safety and convenience to the public with one man. The commission felt, however, that all cars so used should be first approved by the commission and operated on designated routes.

CONSOLIDATION SUGGESTED

On account of the large area covered by the city of Spokane as compared with the population, the commission suggested to the respondent companies the desirability of a consolidation of the two railways. The commission said that if the consolidation could be accomplished no doubt quite a saving in overhead expenses could be brought about with accruing advantages to the public in service.

B. R. T. Adopts Courtesy Code

New Standard Code of Phrases Expected to Simplify Conductor's Job and Promote Pleasant Relations with Passengers

The surface transportation department of the Brooklyn (N. Y.) Rapid Transit System has adopted a standard courtesy code for surface conductors' and motormen's use in dealing with the public on the cars. The bulletin containing the new code explains that the phrases necessary in dealing with passengers on the cars have been reduced to the smallest possible number, and also that each phrase is expressed in the shortest and simplest language possible. It is pointed out to the employees that by the use of such phrases the public will understand better the necessary requests and explanations which have to be made to them on the cars, and that the conductor who knows the right thing to say at the right time is at a great advantage in the efficient performance of his duties over the conductor who has to stop and think up the phrases in which a given request or explanation should be presented.

The code is divided into four subjects for surface conductors: Cash fares, transfers, protecting passengers when boarding and alighting, and directing passengers on cars, and one subject for surface motormen, comprising the phrases for use in dealing with passengers who are boarding or alighting from the front platform.

Beginning Jan. 27, one of these subjects will be taken up each week in the regular weekly efficiency bulletins of the surface transportation department and the employees will be required to learn during the ensuing week the phrases relating to the subject so presented, and start using them on the cars at once.

The elements of courtesy in the code are presented by three phrases: "Please" when a request is to be made of passengers, or directions given to them; "Excuse me" when a conductor is required to disturb a passenger in a car in any way, and "I am sorry" when a request or a desire of a passenger has to be denied. It is explained that these three phrases will carry the employees through almost any situation that may occur, and they are therefore fundamental in the code.

Missouri-Illinois Fares

I. C. C. and I. T. S. File Motions for Dismissal of Fare Injunction Proceedings

Motions requesting that the United States District Court dismiss the injunction suit filed against them on Dec. 27 by the City Counselor asking that the Illinois Traction System lines be restrained from raising the fare between St. Louis, Mo., and the so-called tri-cities in Illinois from 5 to 10 cents were filed on Jan. 17 by the Interstate Commerce Commission and the Illinois Traction System. Former Governor of Missouri Joseph W. Folk, its counsel, signed the motion of the Interstate Commerce Commission. The motion declares that the Illinois Traction System is a corporation engaged in interstate commerce and as such is subject to the Interstate Commerce Commission by federal act, and that any contract between it and the city, whether by ordinance or otherwise, is subordinate to the powers of the commission. It further states that the District Court has not the jurisdiction to restrain the collection of published interstate rates approved by the commission. The District Court has not yet had any hearings on the injunction suit. The 10-cent fare is now being charged.

Increased Fares Proposed

Schenectady Railway Files Notice of Increase for Its Schenectady-Troy and Schenectady-Saratoga Divisions

The Schenectady (N. Y.) Railway has filed notice with the Public Service Commission of the Second District of New York that it intends to increase fares 5 cents each way on two of the company's lines, the Schenectady-Troy division and the Schenectady-Saratoga division. The increased tariff is to take effect on Feb. 16. The sale of commutation books for travel between Ballston Spa and Schenectady, Ballston Lake and Schenectady, and Troy and Schenectady will be continued at present rates. The increased rates are to be brought about by increasing the 5-cent zones from five to six on the Schenectady-Troy division, making the one-way fare between these cities 30 instead of 25 cents; increasing the 5-cent zones from seven to eight on the Schenectady-Saratoga division, an increase from 35 cents to 40 cents, one way. The company contends among other things that its net income has fallen off until it has reached a point where it is insufficient to maintain the integrity of the company's investment, and is inadequate to enable the company to comply with the requirements of the public service law in regard to providing a fund to care for depreciation and contingencies.

Answers Complaints on Heating

The Southwest Missouri Railroad, Webb City, Mo., has reprinted in pamphlet form part of the testimony presented at hearings before the Public Service Commission for the First District of New York, on the subject of car heating, held during October and November, 1909. The commission had previously issued a regulation that all cars between Oct. 15 and April 15 should be heated to a temperature of not less than 45 deg. or more than 65 deg. Fahr., unless the company was temporarily prevented from doing so by storm, accident or other controlling agency for which it was not responsible, and that a thermometer should be carried in each car displayed conspicuously so that the temperature could be read. At the hearings which followed a number of the New York and Brooklyn railway officials explained the practical difficulties of carrying out a regulation of this kind. In consequence of this testimony the commission modified the order by fixing the minimum temperature at 40 deg. and omitting the provision in regard to the thermometer.

The testimony as published in the pamphlet is taken from the reports of the hearings as printed in the ELECTRIC RAILWAY JOURNAL at the time. The pamphlet also contains a copy of a letter written by Mayor Gaynor of New York to a resident of Brooklyn who had complained to him that the cars in that city were not sufficiently heated. Mayor Gaynor replied that he wished that the companies did not heat their cars at all and recommended to the complainant that he walk back and forth from his office for a month and expressed a belief that at the end of that time he would not care so much about heat in the cars or finding fault with everybody and everything. The Southwest Missouri Railroad has a few extra copies of this pamphlet and so long as they last will send one to any manager who is having a cold car controversy.

In a recent letter, A. H. Rogers, president of the Southwest Missouri Railroad, says: "As a matter of fact we receive more complaints of the cars being too hot than of not being hot enough. From my observations, however, the chilly people are the ones who write letters to newspapers and make complaints to city officials."

Uniform Eight-Cent Fare Asked.—The United Railways & Electric Company, Baltimore, Md., has applied to the Public Service Commission of Maryland for permission to charge a regular fare of 8 cents to Curtis Bay all the time, instead of 5 cents in some instances and 8 cents in others, as at present.

Increase in Wages Demanded at Hamilton, Ohio.—Conductors and motormen on the local lines of the Ohio Electric Railway at Hamilton, Ohio, have asked for an increase of wages, which would give first-year men 25 cents an hour, with an increase of 1 cent for each year of service up to 30 cents an hour.

Petition to Require Sale of Tickets in Books.—The Mayor of Newburyport has petitioned for legislation to provide that every street railway in Massachusetts shall sell tickets or books of tickets for not more than 100 rides within limits of any city or town at a cost not to exceed 5 cents per ride within that city or town.

Non-Parking Ordinance Recommended.—The local transportation committee has recommended to the Chicago City Council the passing of an ordinance prohibiting the parking of automobiles in the loop district during rush hours. It is expected that this ordinance will be passed by the Council and become effective on March 1.

No-Smoking Movement at Toledo.—A letter, signed by 500 employees of the Toledo Shipbuilding Company, was received by E. R. Kelsey, of the Toledo Railways & Light Company, on Jan. 16, asking that smoking on the cars be prohibited. Mr. Kelsey has requested a member of the Council to introduce legislation to that effect.

Safety Campaign Aided by Movies at Toledo.—E. R. Kelsey, manager of the publicity department of the Toledo Railways & Light Company, recently made an address before the Scoutmasters' Association on "What the Boy Scouts Can Do for Safety in Toledo." This was accompanied by pictorial lessons in safety first on a moving picture machine.

Massachusetts Road Asks for 7-Cent Fare Unit.—The Worcester & Warren Street Railway has petitioned the Public Service Commission of Massachusetts for authority to increase its passenger fare unit from 6 to 7 cents, effective on Feb. 19. The road extends from West Warren to Spencer, where it connects with the Worcester Consolidated Street Railway. A 6-cent fare unit has been in force on the road for about ten years. The commission will hold a hearing on the application at Boston on Feb. 1.

Jitneys May Be Summarily Removed.—Chief of Police W. J. Petersen of Oakland, Cal., has announced that he will recommend to the City Council that jitneys be summarily removed from the city streets for violation of the traffic ordinance, if the San Francisco-Oakland Terminal Railways will agree to provide better service during the rush hours and an owl service. Mr. Petersen said that the jitney operators have not been obeying the ordinances and in order to remain on the streets they will have to show that their services are needed.

Near-Side Stop Opposed Because of Unpaved Streets.—New traffic ordinance that has been drawn at Galveston, Tex., for adoption by the City Commission contains several features to which objection is made by the Galveston Electric Company and the Galveston-Houston Electric Railway. One of these is the "near-side" stops. Alba H. Warren, general manager of the Galveston Electric Company, says that lack of paved streets in the residential section of Galveston will make this practically impossible. A public hearing on the proposition will be held by the commission, and consideration will be given to the reasons for the opposition.

Fort Worth Jitney Zone Ordinance Upheld.—Jitneys in Fort Worth, Tex., have lost their fight for an injunction to restrain the city authorities from enforcing the city ordinance prohibiting their operation on Main and Houston Streets, which in effect bars them from the business district of the city. The jitney drivers had appealed to Judge R. E. L. Roy of the Seventeenth District Court, alleging that the city ordinance was illegal in that the city had no authority for issuance of such a regulation as a police regulation. Judge Roy held that the city has authority from the Legislature to deny to public carriers for hire, including jitneys, the use of some of its public streets, and that the ordinance is not invalid because it forbids the use of a portion of Main and Houston Streets to jitneys.

Interstate Fare Increase.—The fare from Portland, Ore., to Vancouver, Wash., is to be increased by the Portland Railway, Light & Power Company from 25 cents to 30 cents for the round trip, when the Interstate Bridge across the Columbia River between the two cities is opened for

traffic. The one-way fare of 15 cents will remain as at present. The fact that the tolls on the bridge will be 3½ cents for each street car passenger that crosses the bridge is responsible for the increase. The new tariffs will become effective on Feb. 15, the date it is expected cars will begin to use the bridge. Until the jitneys began to cut into the travel on the Vancouver run, the fare charged by the railway was 30 cents for the round trip. Later, the company cut the fare to 25 cents to those who bought round trip tickets, and the reduced rate was continued after the jitneys quit the run.

Inquiry Asked Into Binghamton Service.—The Council of Binghamton, N. Y., has requested the Public Service Commission of the Second District of New York to conduct an inquiry into the service furnished by the Binghamton Railway. Among other things the Council requests an improvement in the transfer system, cleaner and warmer cars, a half-fare rate for school children and hourly service on all lines from midnight until 6 a. m. The company has issued a statement in rebuttal in which it declares it has spent $500,000 for improvements since September, 1914. It has also recited these improvements in detail and has answered each charge made against it. Among other things, it says that whereas in 1913 the daily number of pull-ins was between thirty-five and forty the rolling stock has been brought to that point of fitness for service where there are only three or four pull-ins a week now.

Sedalia's Advertising Campaign Told in Booklet.—In an endeavor to acquaint its patrons with its operations, expenditures and aims, the City Light & Traction Company, Sedalia, Mo., operated by Henry L. Doherty & Company, ran a series of bi-weekly advertisements, and at the termination of the campaign compiled the advertisements in a booklet and distributed it among its patrons. The company states in its advertisements that its policy can be expressed in one word, "Friendship," for if the citizens have a feeling of real friendship for the company they will extend their patronage, and the company on its part will respond with "Improved Track Conditions," "More Continuous Service," and "Brand New Equipment." In its publicity campaign the company related that it has expended more than $60,000 in the last four years in an endeavor to prove its desire for the friendship of the public.

Efforts to Relieve Congestion at Columbus, Ohio.—The Council has instructed Director of Public Safety Barry to co-operate with the Columbus Railway, Power & Light Company, Columbus, Ohio, in working out a general re-routing plan for the purpose of relieving congestion and overcrowding of cars. Former efforts to re-route cars have met with opposition, but it now seems necessary to take some of them off High Street. Railway officials say that much of the overcrowding is due to congestion on the streets during the rush hours. H. W. Clapp, general superintendent of the company, said that during the past year eleven new cars have been purchased and eighteen rebuilt, modernized cars have been added. Besides, 136 of the large cars have been rebuilt and standardized. For the present year the company will purchase ten new cars and rebuild and modernize eight cars of the summer type.

C. E. R. A. Distributes Joint Time-Table Folder.—The first issue of the new joint interline folder published under the authorization of the Central Electric Railway Association, covering electric railroads in the association territory in Indiana, Ohio, Michigan and Kentucky, has been distributed for general circulation during the past week. This folder is the result of action taken by the C. E. R. A. as an association, for the promotion of increased passenger travel on the lines of the member companies, and the dissemination of information regarding schedules and the possibilities of interline travel to the patrons of these lines. Only those companies having membership in the C. E. R. A. are allowed to subscribe to the publication of this folder. The first issue of the folder is 50,000 copies, which will be increased in future issues in accordance with the demand. More than 80 per cent of the entire mileage of interurban roads in the C. E. R. A. territory is included in this joint folder. The distribution of the folder through approximately 700 time-table racks in ticket offices, hotels, etc., covers seven states, including ninety-five different cities.

Personal Mention

J. O. Shinn has been elected treasurer of the Water, Light & Transit Company, Carrollton, Mo.

H. E. Weyman has been appointed master mechanic of the Levis County Railway, Levis, Quebec.

John Cotter has been appointed roadmaster of the Joplin & Pittsburg Railway, Pittsburg, Kan.

A. F. Lane has been elected president of the Ephrata & Lebanon Street Railway, Ephrata, Pa.

C. A. Trimble has been elected treasurer of the Chicago, Aurora & De Kalb Railroad, Aurora, Ill.

J. C. Phillips has been appointed secretary and treasurer of the Missoula (Mont.) Street Railway.

F. W. Cherry has been appointed receiver of the Chicago, Aurora & De Kalb Railroad, Aurora, Ill.

G. E. Troll has been appointed auditor of the Chicago, Aurora & De Kalb Railroad, Aurora, Ill.

S. A. Moss has been appointed claim agent of the Wichita Railroad & Light Company, Wichita, Kan.

A. H. Dennis has been appointed chairman in charge of the Fort William (Ont.) Electric Railway.

Homer G. Brown has been elected president of the Sacramento Valley Electric Railroad, Dixon, Cal.

J. H. Berry has been appointed electrical engineer of the Maryland Electrical Railways, Annapolis, Ind.

H. O. Evans has been elected vice-president of the Ephrata & Lebanon Street Railway, Ephrata, Pa.

Phifer Smith has been appointed electrical engineer of the Bangor Railway & Electric Company, Bangor, Me.

F. M. Turnbull has been appointed auditor of the Trans-St. Mary's Traction Company, Sault Ste. Marie, Ont.

Penrose Spencer has been elected president of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col.

H. L. Hansen has been appointed assistant treasurer of the Rutland Railway, Light & Power Company, Rutland, Vt.

W. J. Devine has been appointed assistant secretary of the Kentucky Traction & Terminal Company, Lexington, Ky.

H. F. Kirk has been appointed purchasing agent of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.

J. J. Smith has been elected second vice-president of the Sacramento Valley Electric Railroad with office at Brooks, Cal.

W. J. Bohon has been appointed secretary and general manager of the Glendale & Montrose Railway, Glendale, Cal.

Philip J. Kealy, president of the Kansas City (Mo.) Railways, was married on Jan. 23 to Miss Josephine H. Crowley of Washington.

Frank O'Brien has resigned as master mechanic of the Wheeling (W. Va.) Traction Company to accept the position of master mechanic of the Lansing shops of the Michigan Railway.

Edward A. Maher, Sr., vice-president and general manager of the Third Avenue Railway, New York, N. Y., on Jan. 26 was elected president of the company to succeed the late Frederick W. Whitridge.

Col. Bruce Cameron, superintendent of the United Railways, St. Louis, Mo., acted as chief of staff to Governor Frederick D. Gardner of Missouri, at the latter's inauguration on Jan. 8 in Jefferson City.

P. C. Paddock has been appointed purchasing agent of the United Railroads of San Francisco, San Francisco, Cal. Mr. Paddock before his recent appointment had been assistant purchasing agent snce last June.

Travis H. Whitney, member of the Public Service Commission of New York, First District, contributed a communication to the New York *Evening Sun* of Jan. 23, out-

lining the problems attending the construction of New York's new rapid transit facilities.

H. G. Louser, superintendent of the Reading Transit & Light Company, at Lebanon, Pa., has resigned this position in order to take an active interest in the Lebanon Electric Company.

Oliver H. Hughes has been appointed by Governor James M. Cox as a member of the Ohio State Public Utilities Commission, to succeed Louis M. Day. Mr. Hughes had been a member of the commission eleven years, previous to the administration of Governor Frank Willis.

S. J. Witt has been made master mechanic of the West Penn Railways, with office at Connellsville, Pa. Mr. Witt has been in the employ of the company for eleven years and has been night foreman, day foreman and general foreman. He takes the position formerly held by Daniel Durie, who for some time has been superintendent of railway operation of Division A of the West Penn system.

E. J. Mehren has been elected first vice-president of the McGraw Publishing Company, Inc., New York, N. Y., publisher of the ELECTRIC RAILWAY JOURNAL to succeed Hugh M. Wilson, whose resignation took effect on Jan. 1. Mr. Mehren has been editor of the *Engineering Record* for a number of years and will still continue as editor of that paper, devoting to that duty about half of his time.

Eliot Wadsworth of the firm of Stone & Webster, Boston, Mass., has retired from this organization in order to assume the direction of the American Red Cross as acting chairman of the Central Committee in Washington. Mr. Wadsworth graduated from Harvard in 1898, and in the same year entered the employ of Stone & Webster. First at Tampa, and later at El Paso and Dallas, he represented the firm in various capacities. In 1901 he organized the corporation department, and in 1902 the securities department. In 1909 he was admitted to partnership.

George H. Pegram, chief engineer of the Manhattan Elevated Railroad, the Interborough Rapid Transit Company, the Rapid Transit Subway Construction Company and the New York Railways Company, was elected president of the American Society of Civil Engineers at the annual meeting in New York this week. Mr. Pegram's experience in the civil engineering field covers a period of forty years, most of it in railroad work. In 1898, when the construction of a subway in New York City first was being urged strongly and seemed likely to be undertaken, the Manhattan Railway decided to build a number of extensions. It was then that Mr. Pegram was offered the position of chief engineer. The extensions were developed, but the introduction of electricity as a motive power added to the engineering department's responsibility. His appointment as chief engineer of the Interborough Rapid Transit Company and of the Rapid Transit Subway Construction Company came in 1905. Seven years later he was made chief engineer of the New York Railways Company. Among important works to be credited to him are the invention of the Pegram truss, the design of the Kansas City Elevated Railroad and that of the trainshed of the Union Terminal Station at St. Louis.



GEORGE H. PEGRAM

Obituary

James A. MacElhinny, counsel and secretary of the New York & North Shore Traction Company, Roslyn, N. Y., since its organization, died on Jan. 18 at his home in Port Washington, L. I., from pneumonia. Mr. MacElhinny was a graduate of Georgtown and Columbia Universities and was admitted to the bar in 1879.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Springfield-Carbondale Railway, Springfield, Ill.**—Incorporated to construct an electric railway from Springfield to Carbondale, via Hillsboro, Greenville, Carlyle, Nashville and Pinckneyville. Capital stock, $100,000.

***Transcona Electric Railway, Winnipeg, Man.**—Application for incorporation has been made to the Legislative Assembly by the Transcona Electric Railway, with power to construct, operate and equip electric railways, and also to carry on an electric light, power and gas business. Moran, Anderson & Guy, 402 Electric Railway Chambers, Winnipeg, are solicitors.

Coatesville (Pa.) Trolley Company.—Incorporated to construct a 5-mile trolley line. Capital stock, $30,000. H. I. Schotter, Coatesville, president. [Dec. 23, '16.]

FRANCHISES

San Diego, Cal.—The Los Angeles & San Diego Beach Railway has received a franchise from the Council to construct a line in San Diego.

San Diego, Cal.—The San Diego & South Eastern Railway has received a franchise from the City Council of San Diego to construct tracks on several blocks of N. Street, National Avenue and other streets.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has received a franchise from the City Council of East St. Louis granting the company the exclusive right to operate cars over Piggott Avenue. The ordinance gives the company authority to sublease any portion of the Piggott Avenue line to any company desiring to enter the city.

Quincy, Ill.—The Quincy Railway has asked permission from the City Council for the construction of two loops, one at the northeast corner of Tenth and Sycamore Streets and the other at the southwest corner of Ninth and Locust Streets.

Waukegan, Ill.—The Chicago, North Shore & Milwaukee Electric Railroad has submitted a new franchise to the Council of Waukegan. Among the features of the proposed new ordinance are the possibilities of the extension of the Washington Street line and the construction of a powerhouse and carhouse in Waukegan. While the company is not willing to pave Glen Flora Avenue, it is considered likely that it will pay the $60,000 lump concession which has been tentatively agreed upon. The company is replacing all wooden poles with steel or iron, and will relay all tracks with 90-lb. rails, the tracks on North Avenue and Glen Flora Avenue to the tannery to be laid within eighteen months after the franchise is passed.

Canton, Ohio.—The Northern Ohio Traction & Light Company has received a franchise from the Council to construct extensions of its lines in Belden Avenue N.E. and Eighth Street N.E. and in Belden Avenue S.E., both lines to connect with the Tuscarawas Street E. line.

Vancouver, Wash.—With only one or two minor changes, the City Council of Vancouver passed the franchise ordinance granting the Portland Railway, Light & Power Company the right to lay tracks on three streets adjacent to the Interstate Bridge approach across the Columbia River between Portland, Ore., and Vancouver, Wash. The franchise extends for five years, and the company is to maintain the paving between the rails, and for 1 ft. each way. It is optional with the Council to renew the grant after Dec. 31, 1921.

Neenah, Wis.—A new franchise will be granted by the City Council of Neenah to the Wisconsin Traction, Light, Heat & Power Company for extending its lines in Neenah.

TRACK AND ROADWAY

Arkansas Northwestern Railroad, Bentonville, Ark.—Plans are being made to resume operation of this company's line between Bentonville and Rogers. Service was discontinued several months ago, when the St. Louis & San Francisco Railway Company increased the rental on a portion of its track which was used by the company.

The Pine Bluff (Ark.) Company.—This company reports that during 1917 it will construct 1¼ miles of new track.

Northern Electric Railway, Chico, Cal.—The Railroad Commission of California has issued a supplemental opinion in the application of the Vallejo & Northern Railway for permission to build its tracks at grade across the tracks of the Southern Pacific Company in Suisun, extending the time in which the Vallejo Railway & Northern must complete a subway ordered to be constructed by the Commission. A temporary grade crossing was installed to enable the company to secure an entrance to Suisun, and business in Suisun has been adjusted to fit this new line.

Grass Valley, Cal.—The Empire Mines Company has received a permit from the Board of Supervisors to construct an electric railway to connect the Empire and Pennsylvania mines. [Sept. 30, '16.]

Municipal Railways of San Francisco, San Francisco, Cal.—Construction of the line through the Twin Peaks Tunnel will be begun by the Municipal Railways of San Francisco on July 1, and it is expected that the line will be in operation by Sept. 1.

Lordship Company, Bridgeport, Conn.—This company plans to construct a line from Lordship Manor to Hard's Corner, Stratford, this summer. When complete, the Lordship Company will connect with the Connecticut Company's lines at Hard's Corner, extending southerly in Main Street, Stratford, to Lordship, and through Lordship Manor to Hollister and Stratford Avenues, again connecting with the lines of the Connecticut Company. The company recently decided to construct a boardwalk at Lordship, along the shore for about a third of a mile, a building to be used as a restaurant, a large pavilion on the beach for public use, and other features.

Bristol & Plainville Tramway, Bristol, Cnn.—This company has filed a petition to the General Assembly for an amendment to its charter to extent the time to construct and operate a line of not more than two tracks on Main Street, South Street, Wolcott Street, Hill Street, and West Street, Bristol.

***Washington, D. C.**—It is reported that a contract has been closed with the Southern Finance & Construction Company, Nashville, of which John K. Parsons, Wilmington, Del., is president and R. B. Herzer, Nashville, is secretary, to construct a line from Washington, D. C., to Gettysburg, Pa., 75 miles.

Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill.—The Urbana & Champaign Railway, Gas & Electric Company will soon place in service two new turnouts in the eastern part of Urbana to facilitate meeting the city cars of this company with the interurban cars of the Illinois Traction System. The company will also construct some special work in Urbana in order to give the Kankakee & Urbana Traction Company, operating over its lines through trackage agreements, physical connection with the tracks of the Wabash Railway.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—The rehabilitation of this company's property in Waukegan this year includes expenditures to the amount of $250,000, the plans including new lines to be laid on North Avenue and Glen Flora Avenue and improvements along the right-of-way of the West line.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—This company reports that construction will be begun this spring on its proposed line to connect Harrisburg, Pittsburgh, Marion, Johnston City, West Frankfort, Benton and Herrin, 60 miles. Contracts have been awarded to the American Car Company, St. Louis, Mo., for eighteen motor cars; to the General Electric Company, Schenectady, N. Y., for the electrical equipment; to the Illinois Steel Company, Chicago, Ill., for 70-lb. rails; to the Rail Joint Company, Chicago, for rail joints and to the Indiana Tie Company, Evansville, Ind., for ties. Frank Payne, Marion, general superintendent. [Dec. 2, '16.]

Lincoln Railway & Heating Company, Lincoln, Ill.—A company of local citizens is being organized to take over the railway business of the Lincoln Railway & Heating Company. Operation was suspended about two months ago.

St. Joseph Valley Railway, Elkhart, Ind.—It is reported that this company's proposed extension to Pioneer will be completed this summer. It is expected that the line will connect with the Toledo & Western Railroad at Pioneer.

Interstate Public Service Company, Indianapolis, Ind.—This company will construct 2900 ft. of second main track near Indianapolis.

Louisville & Southern Indiana Traction Company, New Albany, Ind.—This company proposes to construct an extension from Jeffersonville to the Howard Shipyards for passenger and freight traffic.

Fort Dodge, Des Moines & Southern Railway, Boone, Iowa.—A report from the Fort Dodge, Des Moines & Southern Railway states that during this year the company will construct 10 miles of line connecting Fort Dodge and Brushy to permit operation to Webster City and Lehigh on the old Crooked Creek Railway, now a part of the Fort Dodge, Des Moines & Southern Railway.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The new bridge over the Kaw River has been completed and is now being used by the Kansas City, Kaw Valley & Western Railway. The temporary bridge is now being torn down.

***Wichita, Kan.**—William R. Burr, Washington, D. C., is interested in the construction of an electric railway to connect Wichita with the oil fields of Augusta and El Dorado.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company plans the expenditure of $200,000 during 1917 for improvements and extensions to its system.

***Boothbay Harbor, Me.**—Luther Mattocks, Boothbay Harbor, is interested in the proposed construction of an electric railway to connect with the Lincoln and Knox County division of the Maine Central Railroad. It is estimated that the cost would be about $150,000, and it is stated that financiers have agreed to furnish half of this amount.

Kansas City (Mo.) Railways.—The following extensions have been ordered by the Kansas City Railways for this year: Indiana Avenue from Thirty-sixth to Forty-third Streets; Twenty-fifth Street from Grand to Troost Avenues; Broadway from Southwest Boulevard to Twenty-fifth Street; Twenty-fifth Street from Broadway to Summit Street; Troost Avenue from Forty-eighth to Fifty-fifth Street; St. John Avenue from Belmont to Bennington Avenue; Cambridge and Winchester Avenues, Kansas City and Independence electric line to Fifteenth Street; Woodland Avenue from Forty-third Street to Swope Parkway; Hardesty Avenue from St. John Avenue to Saida Avenue; Twenty-seventh Street from Chelsea to Denver Avenue; Thirty-ninth Street from Summit to Main Street.

United Railways of St. Louis, St. Louis, Mo.—A report from the United Railways of St. Louis states that it will construct 1 mile of new track in the city of Maplewood during 1917.

Brooklyn, N. Y.—Plans have been approved for the construction of a new bridge across Sheepshead Bay at the foot of Ocean Avenue. The proposed structure will be 700 ft. long and 80 ft. wide, of concrete and steel, with room for a double trolley track. The structure will cost about $200,000.

Brooklyn (N. Y.) Rapid Transit Company.—Bids are now being invited by the Public Service Commission for the First District of New York, to be opened on Feb. 7, for the relocation of the tracks in New Utrecht Avenue, Brooklyn, between Thirty-ninth and Eighty-first Streets, about 2½ miles. Half the cost of the work is to be borne by the Nassau Electric Railroad, a subsidiary of the Brooklyn Rapid Transit Company, and half by the city. There are two surface tracks at the present time on New Utrecht Avenue, located near the easterly curb. They were formerly used for the operation of West End trains, but upon the construction of the New Utrecht elevated line the tracks were given over to trolley operation. The

new tracks will be located approximately in the center of the street.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company expects to construct 2 miles of new track in Erie, Pa., during 1917.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has awarded two contracts covering the construction of the Livonia Avenue extension of the Eastern Parkway in Brooklyn. The contract for supplying the necessary steel was awarded to the American Bridge Company, New York, the lowest bidder, at $1,431,755. The contract for the erection of the steel, and other construction work, was awarded to W. G. Cooper, New York, the lowest bidder, at $257,164. The Livonia Avenue extension is a two-track elevated line to be operated by the Interborough Rapid Transit Company when completed. All work under these contracts is to be done within fifteen months of the delivery of the contracts.

New York, Westchester & Boston Railway, New York, N. Y.—It is reported that this company will construct an extension from White Plains to Danbury.

Empire United Railways, Syracuse, N. Y.—Plans are being made by the Empire United Railways to double-track its line on West First Street, Oswego, from Bridge to Utica Streets, at a cost of about $30,000.

Goldsboro (N. C.) Electric Railway.—This company expects to construct an extension from Belleme to Greenleaf, ½ mile.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Cleveland, Southwestern & Columbus Railway has asked the Public Utilities Commission of Ohio for permission to issue $213,278 in bonds to finance improvements and extensions.

Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company, Hillsboro, Ohio.—At a recent meeting of the Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company, which proposes to construct a line from Hillsboro to Chillicothe, the following officers were elected: J. W. Watts, Hillsboro, president; N. J. McGuire, Indianapolis, Ind., first vice-president; Berry W. Spargur Marshall, Ohio, second vice-president; J. C. Anderson, Chillicothe, Ohio, secretary-treasurer; and R. R. Faulkner, Indianapolis, general manager. [Dec. 30, '16.]

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company plans to construct a temporary track across the South Avenue viaduct which will connect with the Cedar Street and Poland Avenue lines until the new bridge is built.

Port Credit, Ont.—The hydro-radial by-law has been passed by all the municipalities interested from Port Credit to St. Catharines and from Welland to Bridgeburg, with the exception of Hamilton.

Toronto (Ont.) Civic Railway.—The construction of a civic car line on Dufferin Street from the city limits to the Exhibition Grounds is under consideration.

Toronto (Ont.) Railway.—An order has been issued by the Ontario Railway Board to the Toronto Railway to begin the construction of the Pape Avenue extension not later than April 1. The order states that a double track shall be laid on Gerrard Street northerly along Carlaw to Guelph Avenue, then east to Pape Avenue and north to near Danforth.

Southern Pacific Company, Portland, Ore.—It is reported that the Southern Pacific Company plans to construct a line between Portland and Salem.

Jackson Railway & Light Company, Jackson, Tenn.—Work has been begun by the Jackson Railway & Light Company reconstructing its track on Market Street and Highland Avenue.

***Martinsburg, W. Va.**—Surveys are being made for a proposed electric railway from Martinsburg through Jefferson County and into Loudoun County, Va., to connect with the Washington & Old Dominion Railway, which operates a line from Washington, D. C., to Bluemont, Va. The Martinsburg Power Company, Martinsburg, is reported interested.

Milwaukee Western Electric Railway, Milwaukee, Wis.—At the annual meeting of the stockholders of the Milwaukee Western Electric Railway, a plan was adopted, by which a holding company will be formed under the laws of Delaware, to supervise and control the railway. This corporation will be known as the Milwaukee Western Railway Company, with a capital of $2,750,000, of which $2,000,000 will be common stock and $750,000 will be 6 per cent cumulative preferred stock. The property will be owned and operated by the Milwaukee Western Electric Railway Company. Eighty per cent of the stock of the company has been transferred to the holding company, and a committee of Milwaukee business men will shortly start a campaign to complete the right-of-way from Milwaukee through New Butler to Alderly. Committees of business men from towns along the line have been organized to connect the links from Alderly to Fox Lake. With franchises secured for hauling freight, milk, express and mail through Milwaukee, and over the entire route of 74 miles, and with most of the right-of-way held by deeds, ownership of depot sites, and land for park purposes established and gravel purchased, actual construction work will soon be under way. In Milwaukee, the electric railway will pass over the tracks of the Milwaukee Electric Railway & Light Company on Lisbon Avenue, Walnut and Third Streets to the Public Service Building. Fox Lake will be the terminal for the first division of the road to be built now. Eighteen lakes and resorts will be served by the Milwaukee Western Electric Railway, J. W. Barber, Milwaukee, secretary. [Mar. 4, '16.]

SHOPS AND BUILDINGS

Illinois Traction System, Peoria, Ill.—It is reported that this company plans to erect a new modern passenger and freight station in Danville. The new building will have a frontage of 125 ft. on Vermilion Street and will extend west 200 ft. to Walnut Street. The train shed will extend west from the Vermilion Street side and the freight house will be on the Walnut Street side. New tracks will be laid and the cars will avoid passing through the congested public square.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—During 1916 the Arkansas Valley Railway, Light & Power Company constructed 37½ miles of 13,000-volt transmission line and 32 miles of 22,000-volt transmission line, serving the mining and agricultural districts. The 1917 program of the company includes the construction of 10 miles of 13,000-volt transmission line to serve several large irrigation projects. Transformers are being installed in the Cripple Creek district by the company for the 200-hp. slime pumps at the Portland mill. Wires and circuits in the Canon City district are being rearranged.

Morris County Traction Company, Morristown, N. J.—The Morris County Traction Company has closed down its plants at East Dover and Chatham and now secures energy from a substation erected at the foot of Mine Hill, which is operated by the New Jersey Power & Light Company, Dover, N. J.

Lehigh Valley Transit Company, Allentown, Pa.—This company is installing a new 10,000-hp. steam turbine at its power plant in Allentown.

Reading Transit & Light Company, Reading, Pa.—The Metropolitan Electric Company, operating in Reading and vicinity, has constructed nearly 100 miles of transmission lines during the past year in the territory served by that company and the Reading Transit & Light Company. Connections have been made with the properties of the American Gas Company at Pottstown and the United Gas Improvement Company at Norristown. Construction is well along on the transmission line of the Reading Transit & Light Company at Lebanon, which, it is expected, will be finished early in the spring.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being prepared for the erection of an addition to the power plant of the Milwaukee Electric Railway & Light Company in Racine, to cost about $18,000, it is estimated.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases · Business Announcements · Trade Literature

Checking Up the Cost of Last Year's Maintenance Material

A Review of Purchases, Amounting to More Than $1,000,000 for the Last Twelve Months, Shows Large Increases

BY H. J. VANCE
Purchasing Agent Illinois Traction System

At the end of one busy year and at the beginning of another that apparently will excel in complexities, a thorough review of just how prices have been averaging is being made by the purchasing department of the Illinois Traction System and other McKinley System public utilities. This review takes into account the total purchases for maintenance purposes covering a period of twelve months. These purchases will amount to more than $1,000,000. The accompanying list covers a little less than one-fourth of the total.

Each article or class of material bought for maintenance use is considered separately, and the percentage of increase in price is shown. It should be noted that the percentages do not mean the actual percentage of increase in the present market over that of normal times but represent the actual percentage so far as the individual purchase of the McKinley properties are concerned.

The list here shown covers $274,125 worth of purchases for maintenance purposes, of which amount $49,133 is for material which through contract or forced buying does not show any increase over normal times, and, of course, this reduces the percentage as a whole. On the basis of the purchase of $274,125 worth of material, $49,133 of which bears no increase, the actual percentage of increase on the whole is 22½ per cent.

It will be noted, however, from the list, that it does not include copper wire nor steel products to any great extent. When these are included in the other three-quarters of the completed list, it is estimated that the general increase will be between 35 per cent and 40 per cent.

French Industrial Conditions

Report of Commission Discloses Large Field in France for American Manufacturers After the War

The American Industrial Commission to France has made public parts of its report to the American Manufacturers' Export Association on the probable conditions which will confront the industries of France at the close of the war. Interest in the report to electrical manufacturers is heightened by the character of the commission. At its head was W. W. Nichols, assistant chairman Allis-Chalmers Manufacturing Company, Inc., and among the other twelve American engineers or business men who were members of the commission were Dr. C. O. Mailloux, consulting engineer, New York, and J. E. Sague, former New York Public Service Commissioner. The president of the American Manufacturers' Export Association is E. M. Herr, president Westinghouse Electric & Manufacturing Company. The commission sailed from New York on Aug. 26, 1916, and after landing at Bordeaux, made a comprehensive tour of the industrial regions of France.

The portions of the report made public say, in part:

"Even at this time, with the war raging, it was found that there is much reconstruction and new building ready to be undertaken. When peace comes, the amount of construction of industrial plants generally will be large. This applies both to France and Belgium. Since the war a number of companies in the north, unable to operate their mills, have started new plants in other sections of France. We often heard the hope expressed that—after the war—American manufacturers and American capital would cooperate with French interests and erect new plants in France.

"France and America are not likely to be serious competitors in the world market because their strength lies in different directions. Our manufacturing practice is the result of a great uniform steady home demand from one end of the country to the other. Our manufacturers export

INCREASE IN MAINTENANCE MATERIALS FROM RECORDS OF ILLINOIS TRACTION SYSTEM

	Per Cent
Acids	67
Alcohol	43½
Aluminum sulphate	140
Ammonia	11
Armature coils, etc.	14
Armored conductor	25
Asbestos cement	25⅔
Asbestos mill board	120
Ash, soda	7
Attachments	25
Axes	11
Axles	19
Awnings	72
Badges, property	2½
Bars, angle	221
Bars, claw	32
Bars, digging	31
Bars, lining	10
Bars, oval	27
Bars, trolley	40
Bearings	12
Bellows	11
Belting	3⅔
Bends	29
Binders	5
Bits	88
Board, miscellaneous	17
Bodies, socket	11
Boiler cleaners	1
Bolts	71½
Bolts, track	53
Bonds, rail	31
Books	11
Borax	20
Boxes, miscellaneous	8
Blades, hacksaw	27
Blocks, tackle	31
Blotters	100
Braces, crossarm	42
Brackets	7⅔
Brake beams	2¾
Brakes, hand wheel	10
Brass	48
Brasses, journal	54½
Brushes, carbon	6
Brushes, copper	22
Brushes, paint	11
Brooms, mops, etc.	16⅔
Busbar copper	200
Burners	9⅓
Bushings	8
Buttons	5
Cabinets, cut out	4
Cams	6½
Candles	20
Canopies	10
Cans, waste	31
Canvas	25
Caps	7
Cases, bond	10
Cases, pillow	22
Cases, transfer	9
Casings, tire	4
Castings	14
Castings, bronze	25
Catchers, trolley	11
Catches	20
Carbons	20
Cards, index	35½
Carpet	3
Cells	57
Circuit breakers	9
Claim backs	55
Clamps, miscellaneous	7
Clevices	15
Clips	12
Clock dials	3
Cloths, miscellaneous	15
Chain, lamp	34
Chairs, office	4
Chamois	8
Chisels	8
Coil chain	17
Coin bags	6
Cogs, bevel	4
Coke	100
Collars, miscellaneous	7
Commutators	10
Connectors, miscellaneous	30
Compensators	6
Compounds, various kinds	4
Cones, lightning arrester	2½
Contact fingers	5
Contactor repairs	7
Controllers and repairs	15
Copper cable	141
Cord, sash	14
Crucibles	190
Couplers, miscellaneous	12
Covering, pipe	25
Cups, grease	6
Cuspidors	25
Cutters, miscellaneous	3
Covers, miscellaneous	1
Dampers	8
Detector, voltage	10
Dextrine, yellow	20
Dimelites	15
Discs, valve	21
Disinfectants	5
Drills, carbon steel	20
Drills, twist	63
Drilling	19
Duck, canvas	34
Dynamite	30
Ells, miscellaneous	21
Ends, aisle	4
Envelopes	25
Eyes, suspension	9
Eyes, screw	31
Eyelets	25
Fans, exhaust	10
Fasteners, paper	45
Faucets, petroleum	7
Fenders, car	33
Felt, tarred	31
Ferrules, condenser	30
Fiber, drags	3
Fiber, sheet	67
Figures, steel	6
Files	24
Files, machinists'	23
Files, office	8
Fillings, spark cap arrester	66
Films, duplicator	4
Fire extinguishers, etc.	1
Fire clay	7
Fittings, miscellaneous	16
Flags and staffs	24
Forms	24
Fuses	16⅔
Fuse cutouts	29
Gas bags	15
Gas and hose cocks	33½
Headlight repairs	4
Heater repairs	1½
Hinges, butts, etc.	[illegible]
Lamp cord	41
Lanterns, switch lamps, etc.	8½
Lightning arresters	14
Long pull bar ends	6
Lock nuts, washers, etc.	36
Money drawer	17
Motor cars and repairs	17
Oil repairs	14
Pails, galvanized, etc.	56
Paper clips	6
Paper, fish	19
Retriever parts	6½
Sand paper and emery	26
Smithing coal	8
Spring cotters	48
Stove pipe, etc.	21⅔
Switch blocks	8
Tool bags	28
Torpedoes	13½
Trolley cord	8
Trolley crossings and crossovers	24
Trolley harps, etc.	13½
Trolley poles, bases, etc.	18½
Twine	48
Twine, Barbour's	86
Valve chambers	10
Water backs	2
Wheelbarrows	20

only their surplus products, and they can only export them as they are, as they cannot profitably make a smaller amount of merchandise differing from their usual output. Wherever, therefore, the American manufacturers turn out a product which as it stands meets the requirements of foreign trade, they are strong. Certain typical American specialties, sewing machines, cash registers, typewriters, etc., fear no rivals.

"Broadly speaking, French industry has arisen to satisfy its own home wants, which are not large, but very diversified. France has adapted her industry to meet the varied wants of Europe and America, and this has qualified her in a peculiar degree to fill relatively small orders in special artistic goods with special imprints and in special styles with great profit to herself."

So far as railway supplies are concerned, the commission believes that after the war America may be called upon to supply a considerable number of the detailed parts of locomotives and cars, such as axles, journal boxes, wheels and tires. The commission said that it could see no good reason why chilled cast-iron car wheels should not be extensively used on the French railways in freight service. In track material, this country could probably furnish rails to good advantage until the French, Belgian and British mills are able to produce them in sufficient quantity.

Boston Elevated Purchases Thirty-five Large Cars

Permission has been granted by the Massachusetts Public Service Commission to the Boston Elevated Railway to purchase thirty-five steel cars for service in the Cambridge subway and Dorchester tunnel extension to Andrew Square. The contract for the cars has been awarded to the Pressed Steel Car Company, Pittsburgh, Pa., and the trucks to the J. G. Brill Company, Philadelphia. It is expected that the contract for motors will be awarded this week. In a recent letter to the commission, President Matthew C. Brush of the railway company stated that the cost of these cars complete will be about $18,500 each, compared with $11,415 each for similar cars in 1912. Mr. Brush expressed regret at being obliged to purchase cars at the above advance, but informed the board that such action is necessary in order to be prepared for the opening of the tunnel to Andrew Square. The new cars are similar to those already in service in the Cambridge subway and are 69 ft. 2½ in. long over all, seating seventy-two passengers each. The distance from center to center of trucks is 51 ft., and the total estimated weight loaded with 291 passengers at 140 lb. each is 127,147 lb. The total weight of the car light is 86,407 lb., various included weights being body, 41,393 lb.; trucks, 21,961 lb.; two motors without gears, 12,300 lb.; air-brake equipment and piping, 3518 lb.; controlling equipment and conduit, 5620 lb.; miscellaneous, 1615 lb.

National Foreign Trade Convention

The chief topic of discussion at the fourth National Foreign Trade Convention, held in Pittsburgh, Pa., on Jan. 25-27, was the future of the foreign trade of this country after the cessation of hostilities in Europe. In a special report the National Foreign Trade Council called for the immediate enactment of the Webb bill, establishing authorized co-operation among American exporters. Except for certain House amendments, the elimination of which was urged, the Council declared the bill necessary to avert a disastrous condition of "European co-operation versus American-compelled competition" after the war.

Willard Straight, vice-president American International Corporation, New York, N. Y., in speaking on "The Foreign Trade Aspect of the Tariff," stated that the tariff might be utilized for the encouragement of export trade in either or both of two ways—through reciprocal tariff concessions, or by the threatened application of retaliatory measures to prevent discriminations.

Lewis E. Pierson, chairman Irving National Bank, New York, N. Y., was of the opinion that foreign credit practices could be improved. In the course of his address on this subject he said:

"With a few notable exceptions the attitude of American banks toward the extending of credit to foreign customers is very much open to criticism. If we are to become the great creditor nation of the world we must assume the responsibility and develop the liberality which go with that exalted position.

"There is no legislative panacea for the ills of our banking situation in foreign trade. As a basis for constructive results I would suggest the appointment by the National Foreign Trade Council of a committee to co-operate with a committee of the American Bankers' Association to study the question of American banking in foreign trade and make recommendations."

CURRENT PRICES FOR MATERIALS

Quoted Thursday, Jan. 25.

Copper (electrolytic)	New York, 31 cents per pound
Rubber-covered wire (base)	New York, 38 cents per pound
Tin (straits)	New York, 45½ cents per pound
Lead	New York, 7¾ cents per pound
Spelter	New York, 10 cents per pound
Rails, A. S. C. E., O. H.	Mill, $40 per gross ton
Rails, A. S. C. E., Bess	Mill, $38 per gross ton
Wire nails	Pittsburgh, $3 per 100 pounds
Steel (bars)	Pittsburgh, 3.25 cents per pound
Sheet iron (black, 28 gage)	Pittsburgh, 4.50 cents per pound
Sheet iron (galv., 28 gage)	Pittsburgh, 6.25 cents per pound
I-beams over 15 in.	Pittsburgh, 10 cents per pound
Galvanized wire	Pittsburgh, 3.65 cents per pound
Cement (carload lots) without rebate for sacks,	New York, $1.97 per barrel
Cement (carload lots)	Chicago, $1.96 per barrel
Cement (carload lots)	Seattle, $2.20 per barrel
Linseed oil (raw, 5-bbl. lots)	New York, 96 cents per gallon
Linseed oil (boiled, 5-bbl. lots)	New York, 97 cents per gallon
White lead (100-lb. keg)	New York, 9¾ cents per pound
Turpentine (bbl. lots)	New York, 55½ cents per gallon

OLD METAL PRICES

Copper (heavy)	New York, 28½ cents per pound
Copper (light)	New York, 24 cents per pound
Red brass	New York 18 cents per pound
Yellow brass	New York, 17½ cents per pound
Lead	New York, 6.85 cents per pound
Steel car axles	Chicago, $34 per net ton
Zinc	7½ cents per pound
Iron car wheels	Chicago, $19 per gross ton
Steel rail (scrap)	Chicago, $24.50 per gross ton
Steel rail (relaying)	Chicago, $30 per gross ton
Machine shop turnings	Chicago, $9.25 per net ton

Track Circuit Signaling Work Inactive

The manufacturers of track-circuit control automatic block signals report little activity in new work in the electric railway field. Probably the most important job recently completed was the installation of 11 miles of automatic blocking on the Brazil division of the Terre Haute, Indianapolis & Eastern Traction Company in Indiana. One or two prominent interurban systems have recently made inquiries regarding a considerable amount of blocking, but the activity is not sufficient to warrant the statement that these roads will shortly purchase signaling material in any considerable quantity.

Some interurban roads which installed automatic blocking within the last two or three years purchased, at the time of the first installation, certain equipment for future construction work. It is stated that these roads still have the material in their storehouses and that financial and operating conditions have not warranted the erection cost.

The managers of the electric railways, particularly in the interurban territory of the Central States fully recognize the value of signaling, and there is no doubt that when financial conditions are relieved and the high cost of manufactured products seeks its earlier level, there will be an active resumption of block signal work.

ROLLING STOCK

International Railway, Buffalo, N. Y., announces that it will purchase fifty new cars of the front and rear entrance and center-exit type to be used on the city lines.

Montreal & Southern Counties Railway, Montreal, Canada, has placed an order with the Ottawa Car Company for three motor and three trailer cars.

Public Service Railway, Newark, N. J., has ordered fifty open and 100 closed cars from the Cincinnati Car Company. The open cars will be similar to the large open-bench cars described in the ELECTRIC RAILWAY JOURNAL of June 19, 1915, and will be equipped with GE-200 motors with PC control.

The closed cars are similar to those built in the company's shop and described in the ELECTRIC RAILWAY JOURNAL of Jan. 15, 1916, with the exception that seventy-five of them will be equipped with four West. 514 motors, with HLD control, and the remaining twenty-five, intended for the Southern division, will each have two West. 307 CV motors with HL control.

Ft. Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 22 as being in the market for three-passenger cars and one freight motor car, has placed the orders for these cars with the St. Louis Car Company and the Cincinnati Car Company respectively. The following details have been specified for this equipment:

	Motor Car	Freight Car
Type of Car	3-Compartment Interurban	Freight motor
Seating capacity	46	
Weight (car body only)	26,500 lb.	17,500 lb.
Bolster centers, length	28 ft.	22 ft.
Length of body	42 ft. 2 in.	38 ft.
Over vestibule	47 ft.	Over vestibule 40 ft.
Width over sills	8 ft. 9 in.	8 ft. 0 in.
Height, rail to sills	43 in.	39 in.
Sill to trolley base	8 ft. 8½ in.	8 ft. 10 in.
Body, wood or metal	Steel	Wood
Interior trim	Wood, cherry finish	
Headlining	Agasote	
Roof, type	Arched	Arched
Underframe, wood, metal or composite	Composite	Composite
Air brakes	Westinghouse Type D2 EG	Westinghouse Type D2 EG
Axles	Baldwin AERA Standard	Baldwin AERA Standard
Bumpers	Channel	Channel
Cables	Westinghouse	Westinghouse
Car trimming	Statuary, bronze finish	
Conduits and junction boxes	Crouse Hinds	Crouse Hinds
Control, type	Westinghouse HL	Westinghouse HL
Couplers	Tomlinson MCB radial	Tomlinson MCB radial
Curtain fixtures	Ring No. 88 Curtain Supply Co.	
Window fixtures	Forsyth Bros. brass sash	
Curtain material	Pantasote	
Fenders or wheelguards	Steel locomotive pilot	Locomotive pilot
Gears and pinions	Nuttall	Nuttall
Gongs	Crewson pneumatic	Crewson pneumatic
Hand brakes	Peacock no staff	Peacock no staff
Heaters	Peter Smith hot water	
Headlights	Luminous arc and incandescent	Luminous arc and incandescent
Journal boxes	Symington	Symington
Motors, type and number	Four West. No. 306 CV6	Four West. No. 306 CV
Motors	Inside hung	Inside hung
Paint	P.R.R. Standard Flood & Conklin	Yellow car builders System Pan
Sanders	Knight pneumatic	Knight pneumatic
Sash fixtures	O. M. Edwards	
Seats, style	Stationary, cross, St. Louis Car Co.	
Seating material	Plush, leather in smoking room	
Springs	Standard Steel Company	Standard Steel Company
Step treads	Lead filled	
Trolley catchers or retrievers	No. 2 Knutson	No. 2 Knutson
Trolley base	U. S. No. 14	U. S. No. 14
Trucks, type	Baldwin No. 73-18-K	Baldwin No. 73-18-K
Varnish	Flood & Conklin	Flood & Conklin
Ventilators	Railway Utility	
Wheels	Rolled steel standard	Rolled steel

TRADE NOTES

Jarrett Chambers Company, Inc., New York, N. Y., engineers and contractors, announce that C. S. Rindsfoos, C. E., has become associated with the firm.

Railway Improvement Company, New York, N. Y., has received an order of 3800 Rico sanitary straps from the Detroit United Railway.

McGuire-Cummings Manufacturing Company, Paris, Ill., manufacturer of cars and trucks, will rebuild its machine shop during the coming year. The estimated cost of the building is $18,000.

Naugle Pole & Tie Company, Chicago, Ill., has opened an office at 305 Masonic Temple, Cedar Rapids, Iowa, with J. B. Wilmott in charge. This will better enable the company to serve its customers in this territory.

Gulick-Henderson Company, consulting and inspecting engineer, which has physical and chemical laboratories in Pittsburgh and other cities, announces the removal and consolidation of its general offices from 30 Church Street and 120 Broadway to 13-21 Park Row, Suite 1932-1939.

W. L. Batt has been made sales manager of the Hess-Bright Manufacturing Company, and will have entire charge of its sales after Feb. 1, 1917. Mr. Batt has been connected with this company since its early days, and has for many years engaged in doing much of the pioneer work that was necessary to develop the industry in this country.

E. G. Long Company, New York, N. Y., announces that Arthur A. Hebert has joined its staff and will have charge of railway materials and steel products. Mr. Hebert has been identified with the New York office of the Midvale Steel Company for the past fourteen years, being in charge of that office previous to the purchasing of the company by the Midvale Steel & Ordnance Company.

Haese Track Sander Company, Milwaukee, Wis., announces that it has opened new offices at 426 Merchants & Manufacturers Bank Building, Milwaukee, Wis. This company reports orders for sanders from the following street railways: Milwaukee Northern Railway, Chattanooga Traction Company, Eastern Wisconsin Railway & Light Company and the Joplin & Pittsburgh Railway.

Bates Expanded Steel Truss Company, Chicago, Ill., reports the following sales of its expanded steel poles for trolley and line construction work: Chicago, Ottawa & Peoria Railway, eighty-two poles; Chicago Surface Lines, fifty poles for a new extension on South State Street. The Milwaukee Coke & Gas Company has just placed its seventh order for Bates poles which are used for supporting heavy cables and distribution lines.

Johnson Fare Box Company, Chicago, Ill., through its St. Louis agents, the Grayson Railway Supply Company, has received an order for 345 fare boxes from the United Railways Company of St. Louis. With this order completed, the company will have more than 800 Johnson fare boxes in service on its lines. This company also has placed an order with the Johnson Fare Box Company for 200,000 metal tickets of 5-cent denomination, which will be sold to the public in place of paper tickets.

ADVERTISING LITERATURE

Searchlight Company, Chicago, Ill., is distributing a private mailing card on its Searchlight oxy-acetylene welding outfit.

Portland Cement Association, Chicago, Ill., has issued a twelve-page bulletin of suggested specifications for concrete floors, streets and structures.

Electric Storage Battery Company, Philadelphia, Pa., has issued bulletin No. 162 on the progress made in the construction of its new buildings since June, 1916.

Thompson Electric Company, Cleveland, Ohio, is distributing a bulletin on its automatic safety disconnecting hangers, cable clamps and pulleys. This bulletin also illustrates and describes a bracket attachment and spreader arm made by the company.

Western Electric Company, Chicago, Ill., has issued an attractive folder containing reproductions of eleven 4¾ in. x 6¾ in. photographs illustrating the use of its Davis flood lamps in lighting Niagara Falls, the Denver post office, typical railroad and factory yards, etc.

American Railways Equipment Company, Dayton, Ohio, is distributing a postcard folder entitled, "Takes All the Tricks," descriptive of the American fare box, which registers all fares on the fare box and the coins and paper tickets through the fare box.

Barber Asphalt Paving Company, Philadelphia, Pa., is distributing a well-illustrated 20-page booklet on its nonexide wood blocks for use on city streets, bridge floors, piers and in shops. A number of railways, among which are the Philadelphia & Reading and the West Jersey & Seashore, are using these wood blocks for floors in shops and car houses.

Rickard & Sloan, Inc., New York, N. Y., advertising agents, have issued an attractive 24-page booklet on productive publicity, "A Mark and Its Import." The booklet contains reproductions of a large number of two and three-colored plates of catalogs, pamphlets and bulletins which this company has furnished its customers, together with methods of planning advertising campaigns, catalogs, bulletins, etc., for publicity purposes.

Esterline Company, Indianapolis, Ind., is distributing catalog No. 369, describing its graphic instruments, permanent magnets and other electrical specialties. Illustrations and wiring diagrams of graphic meters and clocks are given, and also detailed descriptions of the parts used in their manufacture. Some of the specialties listed are switchboard-type voltage multipliers, transformers, speed recorders and shunts. Several pages contain tables giving the kilowatt capacities of the different types of meters for different currents and voltages, and also tables of dimensions of portable, wall or switchboard-type meters.



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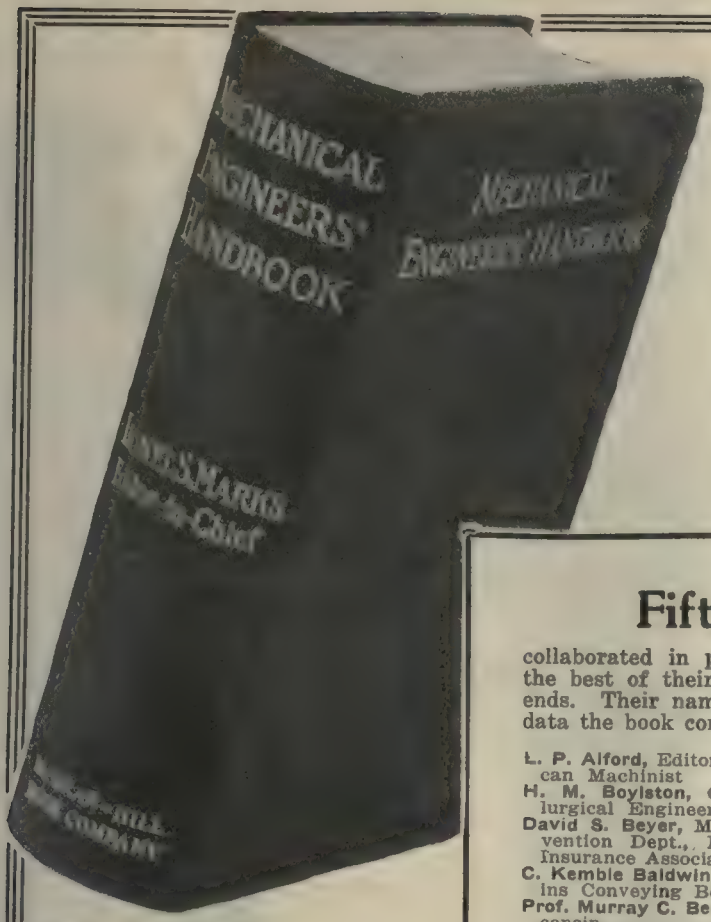
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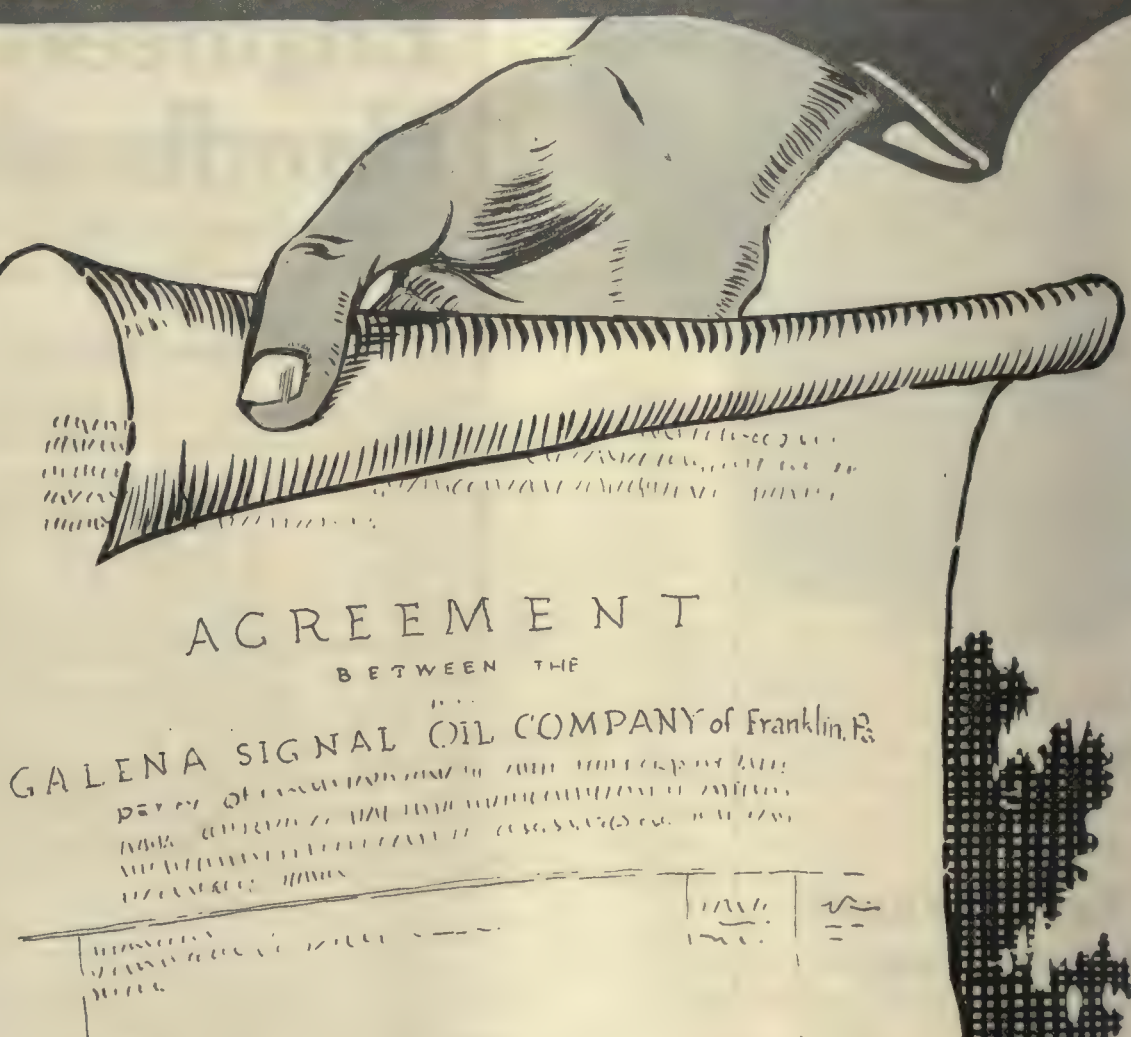
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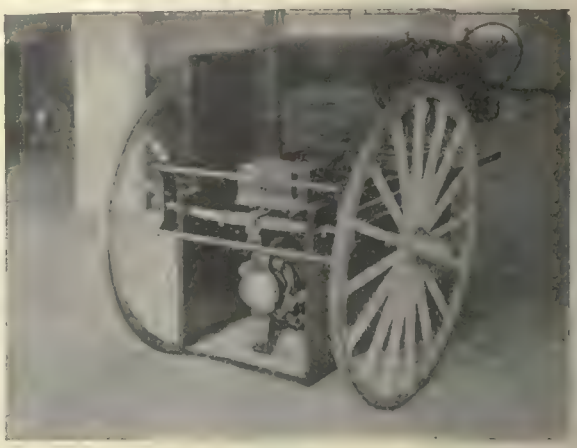
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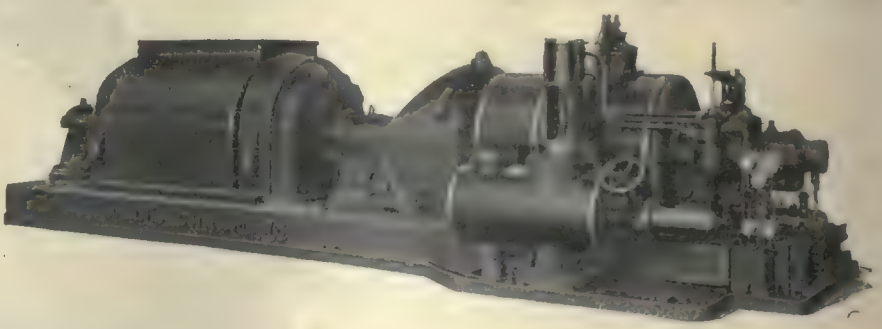
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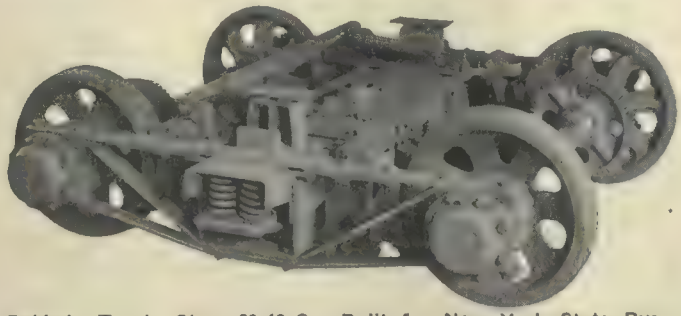
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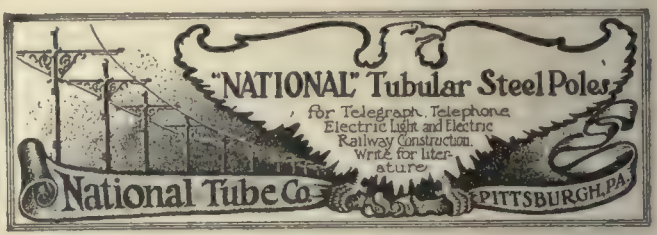
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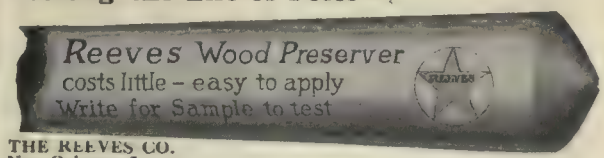
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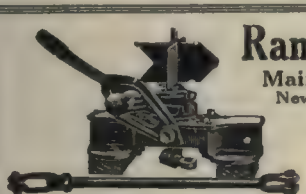
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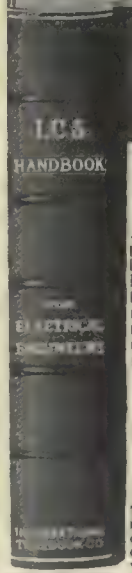
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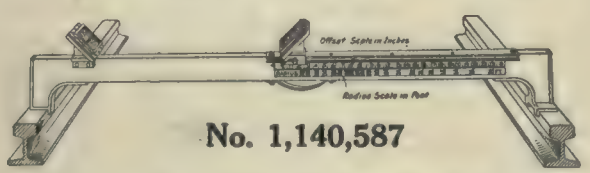
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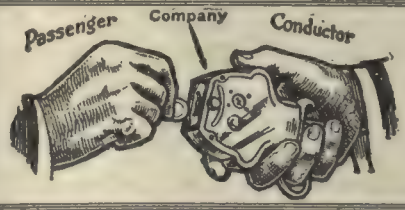
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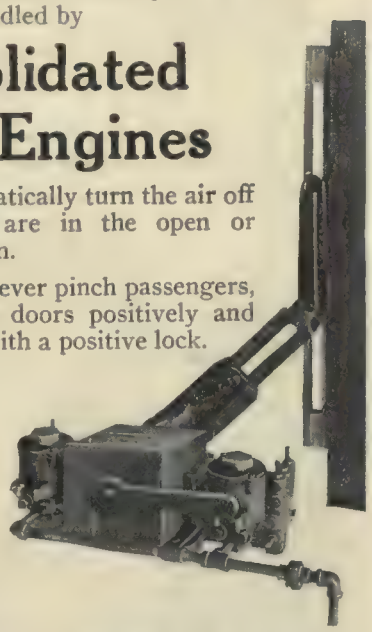
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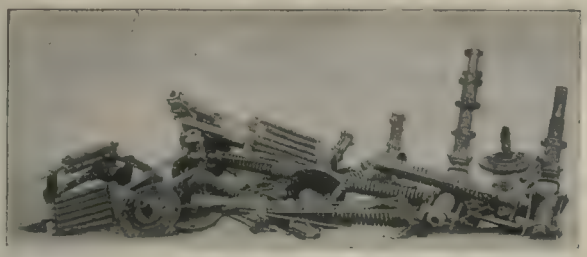
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2—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 r.p.m., with starting motors, also transformers if desired.

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2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

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2—75 to 90 HP. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

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86 Ton Electric Locomotive

Built by The General Electric Co.

Rating 808-E-172-4GE94-600 V.

Dimensions and Weights:

Length inside knuckles	35' 2"
Length over cab	32' 6"
Height over cab	12' 1"
Width over all	10' 1"
Total wheel base	29' 0"
Rigid wheel base	12' 0"
Track gauge	4' 8½"
Total weight	172,500 lbs.
Weight on drivers	117,200 lbs.
Maximum safe speed	60 MPH.
Minimum radius curvature	150 ft.

EQUIPMENT:

Four G.E.-94 bipolar gearless motors with type M multiple unit control; combined straight and automatic air brake; two 16" electric headlights; air operated bell; whistle; pneumatic sanders, etc.

SPEEDS:

Control equipment is arranged for three economical running speeds; slow for switching service, medium for freight service and high speed for fast freight and passenger service.

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Write for Price and Full Particulars to

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The advertisements in the Searchlight Section are constantly bringing together those who buy and sell, rent and lease or exchange. They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have. The cost is a trifle, the results considerable.

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Get your Wants into the Searchlight

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Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost five cents a word, minimum charge $1.50 an insertion.

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If replies are in care of any of our offices, allow five words for the address.

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½ p. (10¼x3⅜ or 5x7 ins.)	40.00	15 inches	40.50

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

1 page	$80 a page	18 pages	$56 a page
3 pages	72 a page	26 pages	52 a page
6 pages	64 a page	32 pages	50 a page
9 pages	62 a page	40 pages	48 a page
12 pages	58 a page	52 pages	45 a page

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE

Fare Boxes for Sale

100 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

Equipment for Sale

600 Kw. direct connected a.c. unit, consisting of one Harrisburg cross compound condensing engine; 4 valve; diam. cylinders, 24" and 46"; stroke, 27"; r.p.m., 120; i.h.p., 800; diam. steam pipe, 10"; exhaust, 20"; steam pressure, 145 lbs.; cut-off, 0.29; vacuum, 26".

Generator G. E., type A. T. B., No. 71078, class 60-600-B-120; form F; volts, 11,000; speed, 120 r.p.m.; amperes, 32.

Control panel and oil switch included.

Prompt shipment can be made.

The American Railways Company, Witherspoon Building, Philadelphia, Pa.

PRACTICALLY NEW

STEEL RAILS 60 lb. A. R. A. Section Series "A." Laid but never used. 4½" high, with angles.

Don't overlook this opportunity to secure New Rails at less than mill cost and for immediate delivery.

CARS

15—Rodgers Ballast, 30 ft., 60,000 Cap. Center Dump—Pass M. C. B. Requirements.

Prompt Shipment—Low price to move quick.

LOCOMOTIVES, CARS, EQUIPMENT, MACHINERY, TANKS, ETC.

Write for 40-page Bargain List.

WALTER A. ZELNICKER SUPPLY COMPANY
ZELNICKER
St. Louis

First Nat'l Bk., Chicago Hennen Bldg., N. Orleans

Main Office: 325 Locust St., St. Louis

What have you to sell?

MISCELLANEOUS

Several Frequency Changers Wanted

3 phase, 25 cycle motor, with 33,000 volt transformers, and 3 phase, 60 cycle generator, 2300 volts; capacity 1500 or 2000 kw. or multiples of same. Separate motors or generators would be considered. Box 1328, Elec. Ry. Jour.

POSITIONS WANTED

AMBITIOUS young electrical engineer, college graduate, 26, desires position. Assistant to manager or superintendent of Railway, lighting and power company. Had 4 years' experience, commercial and engineering departments General Electric Company on engineering problems, concerning large holding companies, such as Byllesby, Stone & Webster, Insull properties, etc., excellent references furnished. Box 1339, Elec. Ry. Jour.

AUDITOR; 12 years' continuous experience in electric railway accounting, solicits position with railway requiring efficient man familiar with handling large properties, systematizating and consolidating companies a specialty. Wish to locate with growing concern where executive ability counts. Married, age 33. Box 1337, Elec. Ry. Jour.

AVAILABLE for busy executive: Assistant with unusual qualifications and experience. College graduate; Member of Bar. Six years in various executive offices of large railway and lighting company. Now law clerk for legal and claim departments. Can take charge of legal and claim work or other detail. Ability backed by judgment and experience. Box 1223, Elec. Ry. Jour.

DRAFTSMAN and designer, experienced on cars and trucks, wishes work to do at home. Your ideas perfected; tracings made. Box 1331, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

EFFICIENT manager of railway and lighting properties open for engagement. Can put your road on paying basis. Salary, $6,000. Box 1315, Elec. Ry. Jour.

ENGINEER—Manager, 24 years' experience in the construction and operation of electric railway and lighting properties. Experienced in all branches, more especially overhead line construction and power station and sub-station construction, equipment and operation. Now employed, but desires change. Will go anywhere. Box 1343, Elec. Ry. Jour.

GENERAL Manager wishes a change. Over 20 years' active experience in electric railway and lighting business. In executive canacity 10 years. Efficiency work a specialty. Box 1332, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS WANTED

GENERAL shop foreman of large property desires position as master mechanic of smaller shop. Familiar with both interurban and city equipment. Box 1319, Elec. Ry Jour., 1570 Old Colony Bldg., Chicago, Ill.

MR. Railway Builder, Owner, Manager—Am superintendent of power company, but want to change to traction or combination. Thirty, married, technical graduate, nine years' experience. Can handle level and transit; have superintended highway work; can handle construction work. Can fill the bill from turning of sod to scheduled operation of system. Need a Live Wire? No lottery number. Write to H. H. Fenton, Blue Rapids, Kan.

PARK Manager, commission or temporary basis: Previous experience guarantees absolute satisfaction. Utilize my advice immediately concerning attractions and concessions necessary to greatest success this year. Box 1334, Elec. Ry. Jour.

TRAFFIC man—Ten years' experience, steam and electric. Age, 27. Single. Best references. Now traffic manager electric line. Desires change. Position with mercantile house preferred. Box 1338, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

YOUNG man (age 30), experienced in transportation affairs, city and interurban, desires location, superintendent or assistant. Highest references from present and former employers. Box 1342, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

POSITIONS VACANT

COMPETENT Electrician-Mechanic for maintenance of three 18 ton BW. mine locomotives and four miles of trolley system. Permanent position to capable man. State age, experience, references and salary. Address Supt. of Transportation, Alaska Gastineau Mining Co., Thane, Alaska.

DRAFTSMAN for master mechanic's office wanted. Must have good electrical and mechanical knowledge and strictly sober. State experience and salary expected. Box 1320, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.

DRAFTSMAN wanted. Young man with some experience in computing and laying out special track work for electric and steam railroads. Give full particulars with reply and state salary desired. New York Switch & Crossing Co., 15th & Madison Streets, Hoboken, N. J.

FLORIDA traction company operating small storage battery system desires manager thoroughly qualified in every detail of management, operation and maintenance. Address with full particulars. Box 1341, Elec. Ry, Jour.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.

The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will probably furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device Co

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co

Anchors, Guy.
Electric Service Supplies Co
Holden & White.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axles.
National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co

Axles, Car Wheel.
Bemis Car Truck Co
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The
Western Electric Co.

Bankers and Brokers.
National City Co.

Batteries, Dry.
Western Electric Co.

Batteries, Storage.
Electric Storage Battery Co.
Western Electric Co.

Bearings and Bearing Metals.
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
More-Jones B. & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

Benders, Rail.
Niles-Bement-Pond Co.
Western Electric Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.

Boiler Tubes.
National Tube Co.

Bond Clips.
Electric Railway Improve. Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improve. Co.
Ohio Brass Co.
Prest-O-Lite Co., Inc.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Bonds, Soldered.
Horne Mfg. Co.

Bonds Welded.
Lincoln Bonding Co

Book Publishers.
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Int'l Creosoting & Constr. Co.
Lindsley Bros. Co.
Ohio Brass Co
Western Electric Co.

Brake Adjusters.
Holden & White.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M W. & M. I. Co.
Horne Mfg. Co.
General Electric Co.
Holden & White
Long Co., E. G.
National Brake Co.
National Safety Device Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Brooms, Track, Steel or Rattan.
Western Electric Co.
Zelnicker Supply Co., W. A.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Brushes, Graphite.
Dixon Crucible Co., Jos.

Brush Holders.
Anderson Mfg. Co., A & J. M.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunkers, Coal.
Beaumont Co., R. H.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—(See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Car Stops, Automatic.
Consolidated Car-Heating Co.

Castings, Brass.
Frankel Connector Co.
More-Jones B. & M. Co.

Castings, Composition or Copper.
Anderson Mfg. Co., A. & J. M.

Castings, Gray Iron and Steel.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Horne Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N

Ceiling, Car. (See Headlining.)

Chain & Belt Machinery.
Beaumont Co., R. H.

Charging Sets, Storage Battery.
General Electric Co.

Chemists.
Little, Inc., Arthur D

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co

Clamps.
Frankel Connector Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co
Frankel Connector Co.
General Electric Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Cincinnati Car Co
Ohio Brass Co.
Western Electric Co.

Cleats, Car Wiring.
General Electric Co

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co
Electric Service Supplies Co
Western Electric Co.

Coils, Armature & Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co

Coin-Counting Machines.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters.
Electric Service Supplies Co
General Electric Co.
Westinghouse Elec. & M. Co
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
Western Electric Co.
Westinghouse Elec. & M. Co

Compressors, Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits.
Western Electric Co.



Model 370—A.C. and D.C. Ammeter

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Polyphase Wattmeter and Model 341 A.C. and D.C. Voltmeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1% full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

THE Art of Electrical Measurement, its perfection and its growth, have been associated inseparably with this name—

Weston

From the year 1888 to now, each successive instrument that has borne the name has marked the highest achievement in the Art.

At no time has Weston superiority been more obvious than in the present models.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits, Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

Weston Electrical Instrument Company

21 Weston Ave., Newark, N. J.

New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, Boston, Buffalo, Richmond, San Francisco, Denver, Detroit, St. Louis, Toronto, Winnipeg, Montreal, Vancouver, Berlin, London, Paris, Petrograd, Florence, Johannesburg, S. Africa.

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago Washington, D. C.

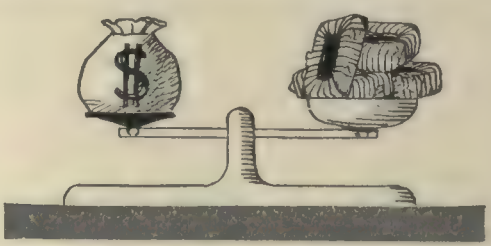
RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels

Special Agents for { Tool Steel Gear & Pinion Co. / Johnson Fare Box Co. / C. & C. Electric & Mfg. Co. / Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.



They're as Good as Cash

—those old field coils in your shops. Copper is worth too much to send to the melting pot. Send those old coils to us—let us remove the old insulation, clean and anneal the wire and reinsulate it with

Salamander Pure Asbestos

We will then rewind the wire into new coils of precisely the same characteristics as the old ones.

This is much cheaper for you than buying new coils, for the only charge we make is a very small one for the actual insulation used.

Send us some of those old coils so we can show you what we can do.

Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Connectors, Solderless.
Frankel Connector Co.

Controller Fingers.
Horne Mfg. Co.

Controller Handles.
Horne Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
Beaumont Co., R. H.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works.

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Cincinnati Car Co.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes. (See also Hoists.)
Allis-Chalmers Mfg. Co.
Beaumont Co., R. H.
Niles-Bement-Pond Co.

Creosoting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Culverts.
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart.
Pantasote Co., The.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Prest-O-Lite Co., Inc.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co.

Despatching Systems.
Simmen Automatic Ry. Sig. Co.
Western Electric Co.

Destination Signs.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Detective Service.
Wisch Service, P. Edward.

Door Operating Devices.
Consolidated Car-Heating Co.

Doors and Door Fixtures.
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

Doors & Shutters, Fireproof.
Kinnear Mfg. Co.

Doors, Steel Rolling.
Kinnear Mfg. Co.

Draft Rigging. (See Couplers.)

Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The.
Byllesby & Co., Inc., H. M.
Drum & Co., A. L.
Ford, Bacon & Davis.
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Roosevelt & Thompson.
Sanderson & Porter.
Scofield Engineering Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

Engines, Gas and Oil.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

Engines, Steam.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

Fare Boxes.
Brill Co., The J. G.
Internat'l Register Co., The.
Johnson Fare Box Co.

Fences and Fence Posts.
American Steel & Wire Co.

Fencing Wire.
American Steel & Wire Co.
Page Woven Wire Fence Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Horne Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Star Brass Works
Western Electric Co.

Fibre.
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

Fibre Insulation.
U. S. Metal & Mfg. Co.

Fibre Tubing.
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

Field Coils. (See Coils.)

Flooring Composition.
American Mason Safety Tread Co.
Western Electric Co.

Forgings.
Standard Steel Works Co.

Frogs, Track. (See Track Work.)

Furnaces. (See Stokers.)

Fuses and Fuse Boxes.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Fuses, Refillable.
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets.
Diamond State Fibre Co.
Horne Mfg. Co.
Power Specialty Co.

Gas Producers.
Westinghouse Elec. & Mfg. Co.

Gates, Car.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.

Gages, Oil and Water.
Ohio Brass Co.

Gear Blanks.
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
U. S. Metal & Mfg. Co.
Westinghouse Elec. & M. Co.

Gears and Pinions.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Long Co., E. G.
Nuttall Co., R. D.
U. S. Metal & Mfg. Co.

Generating Sets, Gas-Electric.
General Electric Co.

Generators, Alternating Current.
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Generators, Direct Current.
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs.)

Graphite.
Dixon Crucible Co., Joseph.
Morgan Crucible Co.

Greases. (See Lubricants.)

Grinders and Grinding Wheels.
Western Electric Co.

Grinders, Portable, Electric.
General Electric Co.
Railway Track-work Co.
Western Electric Co.

Guards, Trolley.
Electric Service Supplies Co
Ohio Brass Co.

Harps, Trolley.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works
Western Electric Co.

Headlights.
Electric Service Supplies Co.
General Electric Co.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Headlining.
Pantasote Co., The.

Heaters, Car (Electric).
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Water.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Stove.
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists & Lifts.
Beaumont Co., R. H.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co
Niles-Bement-Pond Co.

Hose, Bridges.
Ohio Brass Co.

Hydraulic Machinery.
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Hydrogrounds.
Horne Mfg. Co.

Inspection.
Electrical Testing Lab's., Inc.
Hunt & Co., Robt. W.

Instruments, Measuring, Testing and Recording.
General Electric Co.
Sangamo Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

Insulating Cloth, Paper and Tape.
Horne Mfg. Co.
Diamond State Fibre Co.
General Electric Co.
Packard Electric Co.
Standard Woven Fabric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

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Printing begins on Tuesday of each week.
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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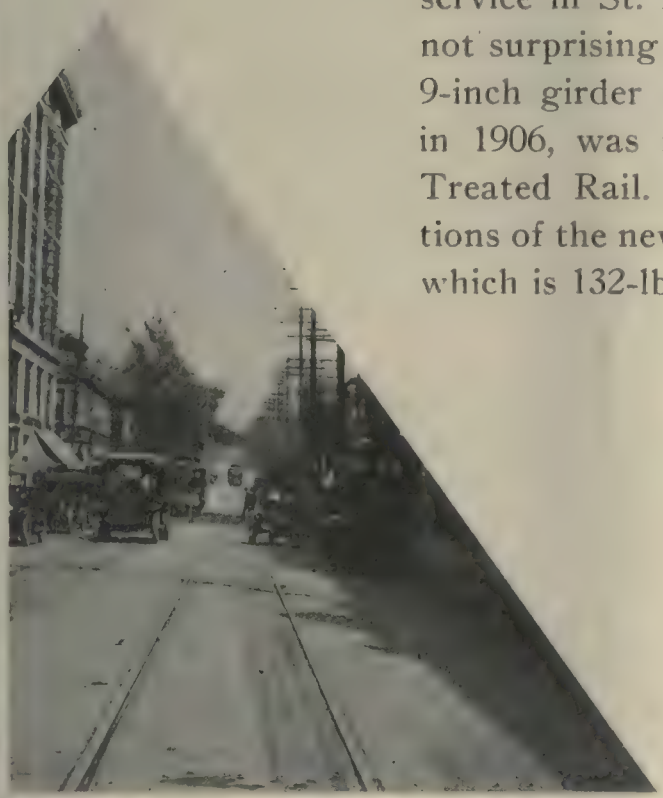
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TITANIUM-TREATED RAIL

Carries 365,000 Cars per Year on Olive Street, St. Louis

Each track on this street of heavy traffic carries a daily total of 1000 cars, the average weight per car being 45,000 lb.

Titanium-Treated Rail has been in service in St. Louis since 1912, so it is not surprising that last year the 112-lb. 9-inch girder rail, laid in Olive Street in 1906, was replaced with Titanium-Treated Rail. Here are the specifications of the new Titanium-Treated Rail, which is 132-lb. Lorain Section 440:



Carbon	0.70 to 0.85
Silicon not over	0.20
Phosphorus not over	0.04
Manganese	0.60 to 0.90

To insure a flawless, long-lived rail, be sure to write Titanium-treatment into your rail specifications.

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Operating Under Rossi Patents — Processes and Products Patented

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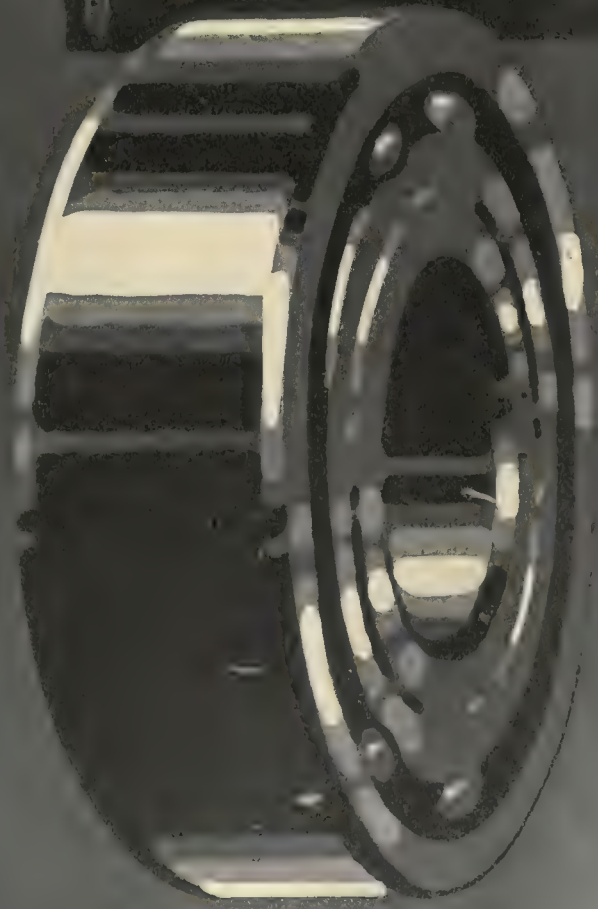
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Great Britain and Europe. T. ROWLANDS & CO., Sheffield, England





SEVERE SERVICE

is not imposed on all motors.

But provision for severe service is a consideration that must work to the benefit of both motor maker and motor user.

Such provision is simply a matter of specifying Gurney Ball Bearings—

—for capacity and endurance.

Gurney Ball Bearing Co.

General Patent Licensee

JAMESTOWN, N. Y.

Chicago New York

BRILL-BUILT LIGHT-WEIGHT ONE-MAN CARS

The Birney type of light-weight one-man car is popularly known as the "Safety Car," because in case of emergency the mere lifting of the motorman's hand from the controller handle instantly cuts off the power, puts on the brakes, starts the sand and opens the doors.

These safety devices working all in unison thru one small operation save precious seconds of time, and thereby reduce the distance covered in making an emergency stop.

And the motorman having but one thing to do to stop his car in the shortest possible space can do it just as promptly and efficiently whether his action is voluntary or involuntary.

So instead of one-man operation increasing the hazards, the "Safety Car" is actually safer than the ordinary car with its crew of two.

The Birney "Safety Car" is built for both single and double-end operation. Ten cars for double-end service — like that pictured below—were recently furnished to the Stone & Webster lines at Fort Worth.

Plate girder sides with substantial angles at bottom, an upper structure of continuous T-posts and a bottom frame of channel-end sills and angle crossings are figured and built with generous margin of resistance to any load and operating stresses.

The single-end "Safety Car" weighs 4000 lb. for the body, less electrical equipment. The double-end car, shown below, weighs 6000 lb.



"Look it up in Brill Magazine"

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
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The G-E 258 Ventilated Railway Motor

is a wonderful little motor.

Look at a truck with the little 258's neatly stowed away well within the 24-inch space!

Then look at the car that four of these motors will haul at increased schedule speeds!

And the most wonderful part is that the G-E 258 weighs only 885 pounds—every ounce a G-E Ventilated Railway Motor.

It is already a standard on many roads. Over a thousand now in use.

6711



The G-E 258 is a 25 H.P. box frame motor for light weight 24-inch wheel cars. Ball bearings and G-E multiple ventilation.



General Electric Company

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How a Public Service Commission Works

ELECTRIC RAILWAY JOURNAL

New York, February 3, 1917 McGraw Publishing Co. Inc. Vol. 49, No. 5 10c a copy



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You study the efficiency of your boilers, engines, generators, etc., and demand every possible saving in the **production** of energy. Then you send that energy out on the line to the motorman who **uses it.**

Are you studying efficiency in the use of this energy?

When you consider that the motorman is the principal **user** of the power plant output, isn't it logical to give him every opportunity to conserve that output?

The Sangamo Economy Meter and Economy Campaign will teach your motormen to be as efficient in the **use** of energy as your engineers are in its **production.**

Sangamo Electric Company
Springfield, Illinois

Specialists in Meters for Every Electrical Need

Baldwin-Westinghouse Electric Locomotives



ELECTRIC locomotives are no longer an experiment, but a reality.

Baldwin-Westinghouse Electric Locomotives are successfully fulfilling the passenger and freight requirements of many electric roads throughout the country. These locomotives have inherent advantages that make them valuable revenue builders for electric railways.

They are the combined product of The Baldwin Locomotive Works, pioneer steam locomotive builders; the Westinghouse Air Brake Co., the pioneer air brake builders, and Westinghouse Electric & Mfg. Co., leading builders of Electric Railway Motive Power Apparatus.

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Philadelphia, Pa.

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East Pittsburgh, Pa.



ELECTRIC RAILWAY JOURNAL

VOLUME XLIX, No. 5 NEW YORK, FEBRUARY 3, 1917 PAGES 193 TO 236

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

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The Westinghouse Inspector-Specialist saw at a glance what was wrong and pointed it out, saying: "The piping is wrong. They did not follow the blue print. The main reservoir pipe is connected to the brake cylinder port of the triple valve. Correct that error and put the car on it's run."



The Message from the Car Barn

"Yes, Mr. President, thanks to that Westinghouse Inspector-Specialist, we have all of those ten new cars in service earning nickels. We're handling a record holiday crowd and cleaning up corners at every stop. We made a slip-up in the piping. He set us right—came 500 miles on our wire at his own expense—made no kick, even though the fault was ours."



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PITTSBURGH:
Westinghouse Building

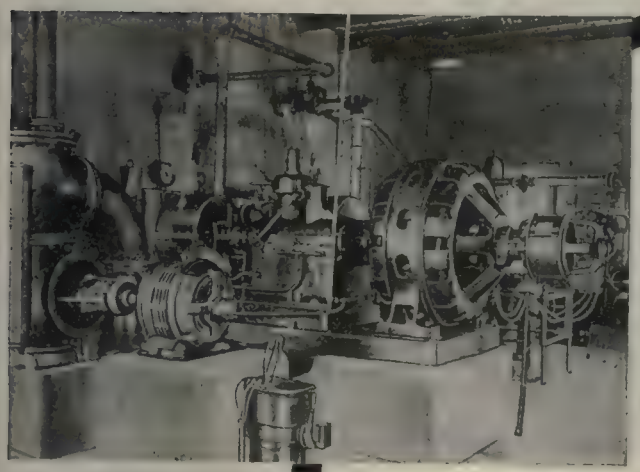
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TRADE MARK

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Remarkable Economy



150 kw. Westinghouse Geared Unit Exhausting into Condenser. Dowagiac (Mich.) Municipal Plant.

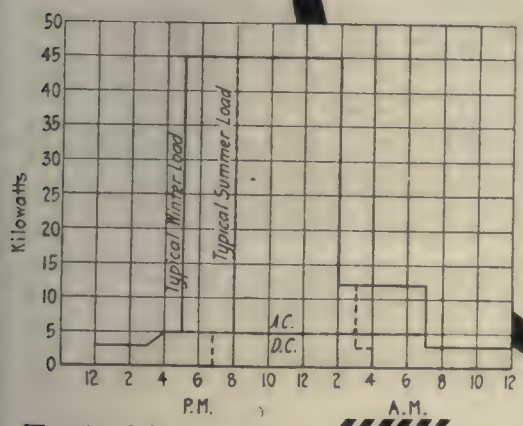
The 150 kw. Westinghouse Geared Unit---

—at the City of Dowagiac, Mich., operates at less than one-third its rated capacity.

The economy of this unit at fractional loads is so good that it was practical for this municipality to anticipate future requirements by installing now, a unit that will handle over three times the present load.

Write for Leaflets 3869 and 3870.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.



Typical Summer and Winter Loads carried by the Dowagiac plant.

W WESTINGHOUSE ELECTRIC

Load at less than one-third load

(See the July 8, 1916 Electrical World for a description of this plant.)



Can't Step Up

When the trolley pole jumps the O-B Trolley Catcher stops it quickly and surely. The rebound of the pole is not sufficient to release the O-B Catcher's hold.

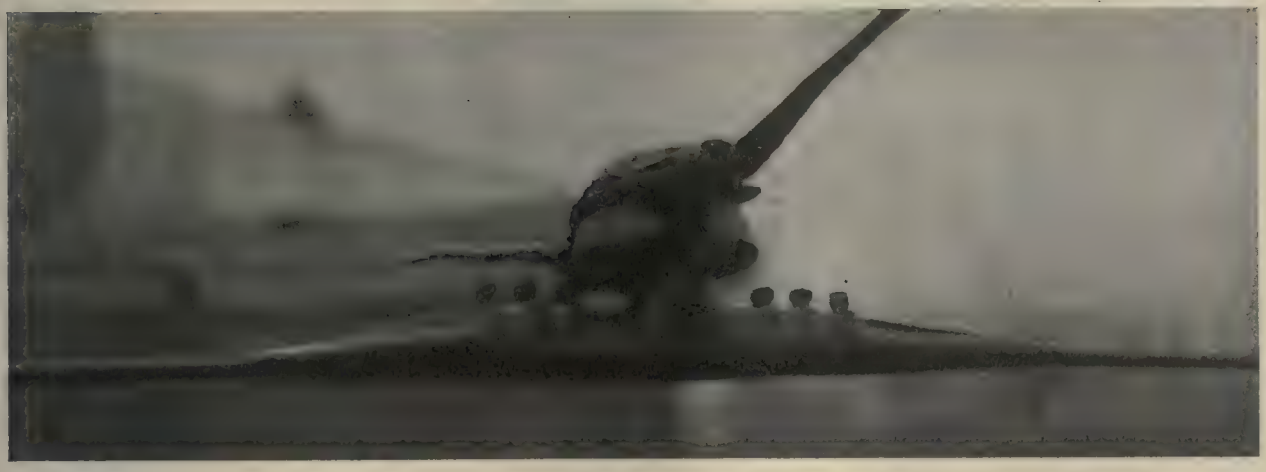
Therefore, the pole does not go climbing up a little at a time, but it stays caught.

All parts are rugged and the Catcher is well fitted for the most severe service.

Write for a full explanation of the O-B Catcher's operation and particulars of our trial offer.

The Ohio Brass Co.

Mansfield, Ohio



Preserves the Wire

After two years of service on a busy street the trolley wire shows no additional wear where it enters the O-B Type C Splicer. The photograph above shows this plainly.

This particular case is typical of the way the O-B Type C Splicer preserves the wire.

These are the reasons:

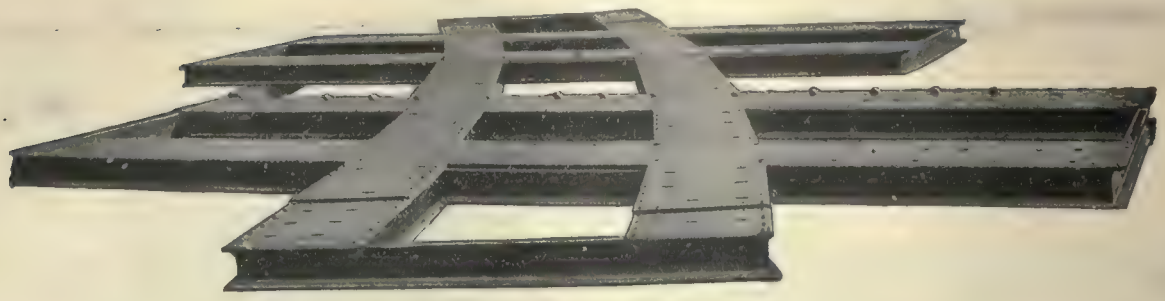
Wire goes in without bending.
Long smooth approach for wheel.
Good wheel clearance.
No hard spot in line.
Arcing minimized.

Many properties are effecting large savings, especially with copper at its present price, by installing the O-B Type C Splicer, on new wire and old.

Shall we send you a sample Splicer?

The Ohio Brass Co.

Mansfield, Ohio



INTERNATIONAL
STEEL CROSSING FOUNDATIONS

are the product of good engineering and long experience

They are box girders, built up of channels and plates, reinforced with diaphragms at the crucial points and filled with creosoted wood block.

The blocks are yellow pine, laid transversely with the rail. They serve to transmit the loads from the upper to lower plates, give the structure resilience and preserve the interior of the girder.

International Steel Crossing Foundations are not an experiment. For five years they have been in service under all classes of steam and electric road traffic. They have done all we claim for them in reducing maintenance and they prevent rail creeping.

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Let us submit prices for your crossings and show you the economies.

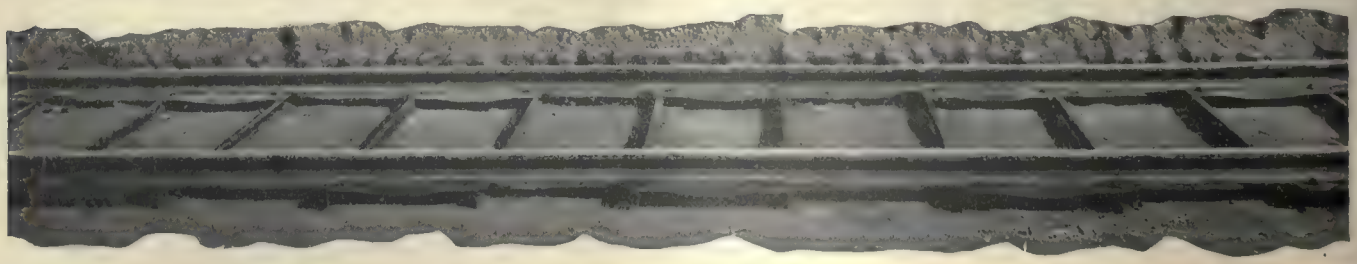
The International Steel Tie Company

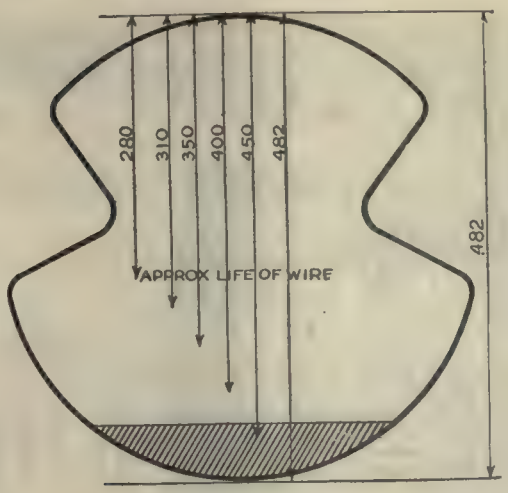
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J. E. Lewis & Co., Dallas, Texas.
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William H. Ziegler, Minneapolis, Minn.





This is the way Phono-Electric is wearing in service

This cross-section of a No. 0000 Phono-Electric Trolley Wire is taken from the records of a big catenary system operating at 11,000 volts.

The shaded portion represents the worn portion of one division, as determined after a series of careful gagings.

Note that neither high-voltage nor high-speed operation prevented Phono-Electric from giving honest wear.

Phono-Electric has not burned, pitted or corroded.

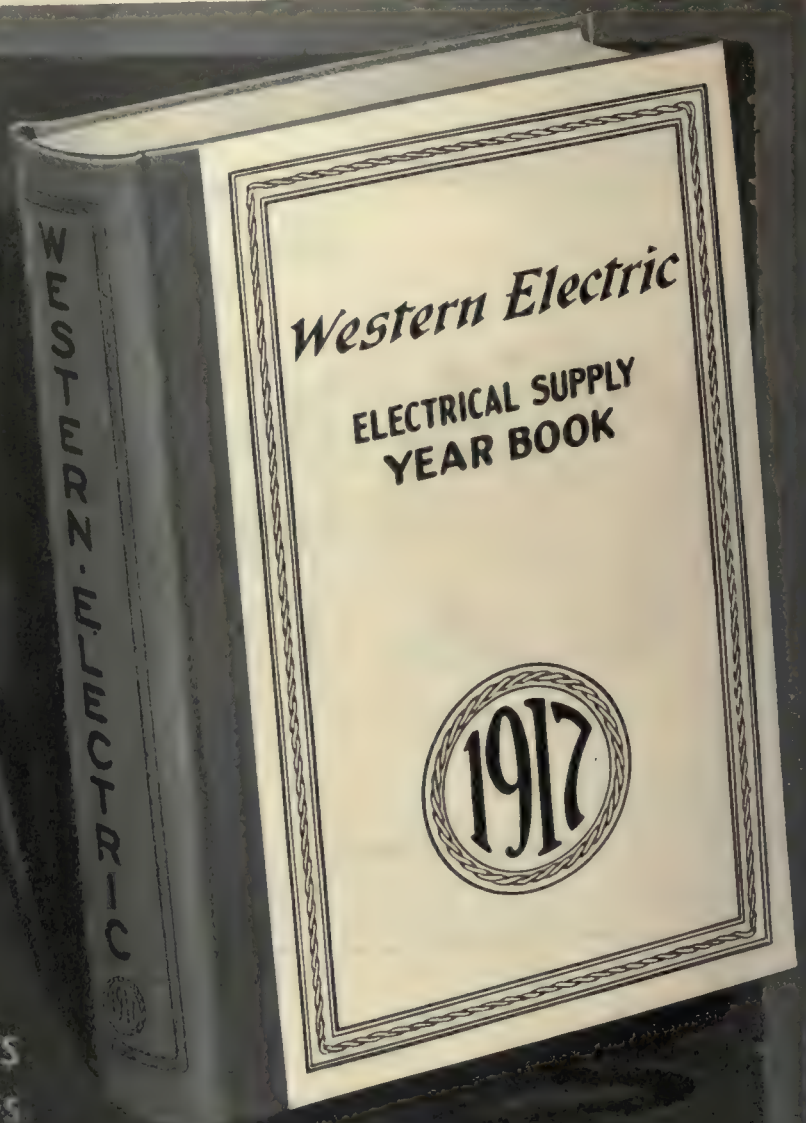
Phono-Electric has not only avoided these troubles to date—it is going to keep on avoiding them because of the homogeneous structure of Phono-Electric.

What other wire could be trusted to wear safely from a perpendicular depth of 0.482 in. to only 0.280 in.?

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free from imperfections of braid or finish. Consequently it resists wear many times longer than common rough cord. *Compare it—then buy it, use it, and save money.*



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How many hundreds of feet of broken trolley cord have you scrapped and how many times could you have used Keystone Cord Connectors and have saved both time and material.

Always use them. They do the job right.



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BECAUSE THE ANNULAR RIBS have square corners that bite into the cord and won't let go.

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has received due consideration in

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Look over these possible seating and aisle plans of the same cars.

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LAYOUT—EQUIPMENT—OPERATION—MAINTENANCE

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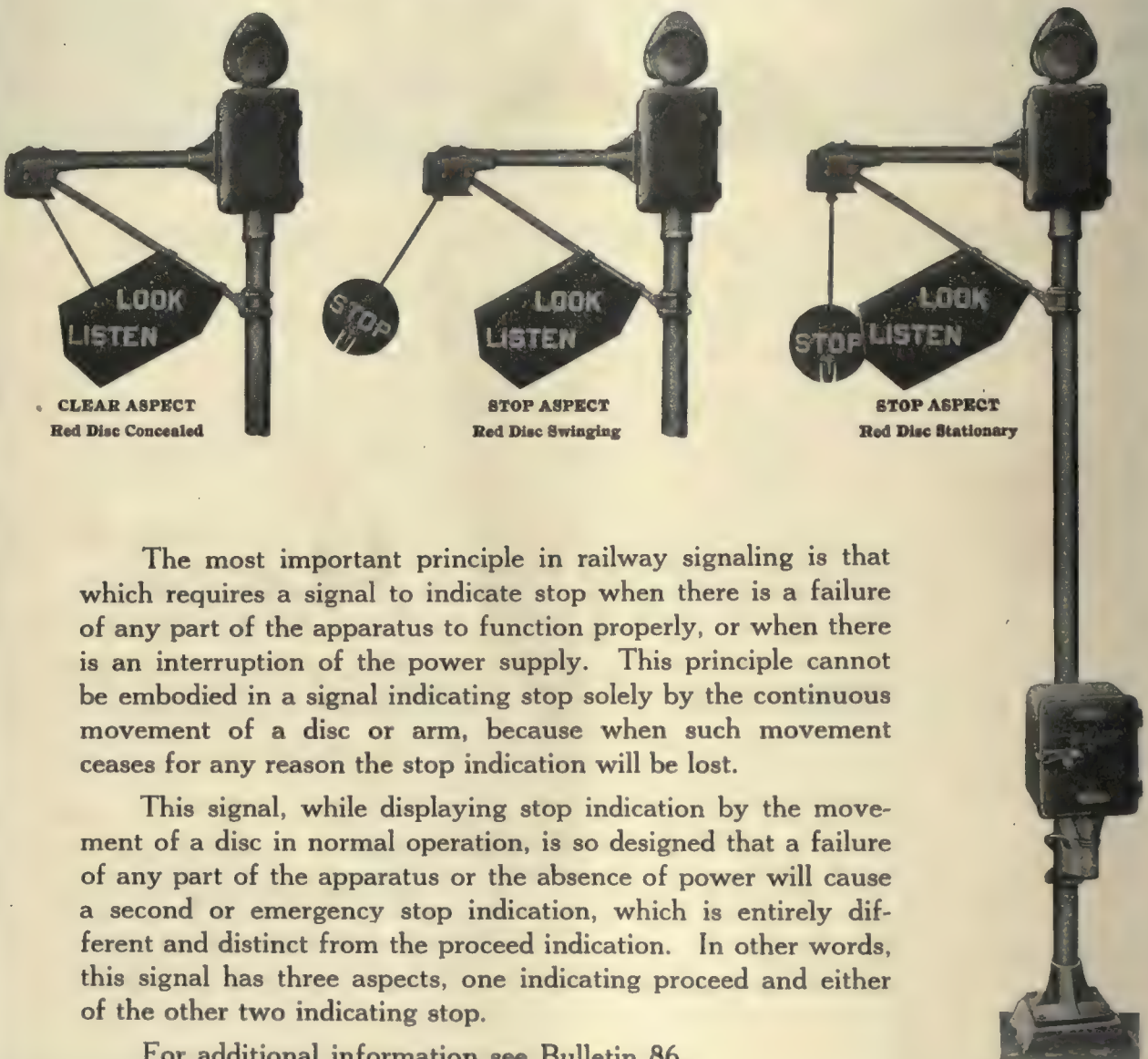
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Style "DW"



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Red Disc Concealed

STOP ASPECT
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The most important principle in railway signaling is that which requires a signal to indicate stop when there is a failure of any part of the apparatus to function properly, or when there is an interruption of the power supply. This principle cannot be embodied in a signal indicating stop solely by the continuous movement of a disc or arm, because when such movement ceases for any reason the stop indication will be lost.

This signal, while displaying stop indication by the movement of a disc in normal operation, is so designed that a failure of any part of the apparatus or the absence of power will cause a second or emergency stop indication, which is entirely different and distinct from the proceed indication. In other words, this signal has three aspects, one indicating proceed and either of the other two indicating stop.

For additional information see Bulletin 86.

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Trade Mark

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Be consistent.



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And they *do* keep the cars a-moving—yes, brother, they do: "muy pronto," as they say on the Border.

U.S. ELECTRIC SIGNAL CO. WEST NEWTON, MASS.

United States Electric Signal Co.

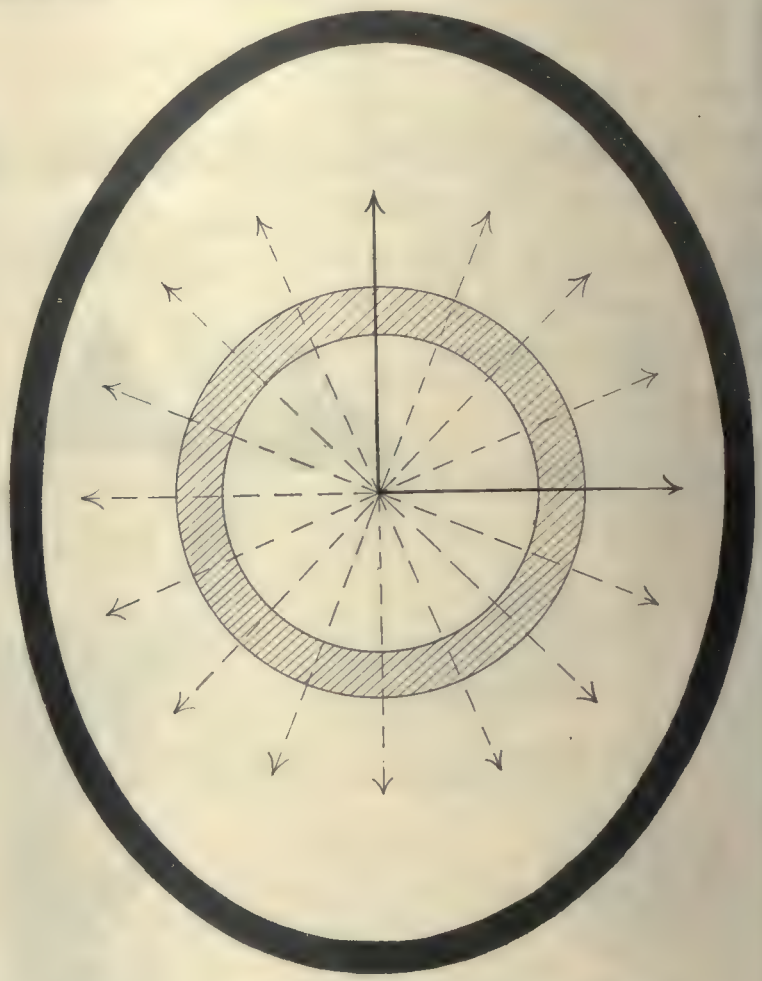
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show same deflection under load applied in any direction



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You know how important this feature is whenever you want a pole to take strains from several different directions. Elreco Poles simplify installation and construction engineering work.

Why should you install two poles of other shapes for corners or curves when one Elreco Tubular Pole would serve?

Elreco Tubular Poles also have much reserve strength. The extra tension from a span wire which has been struck violently by a car pole produces no permanent set. Actual service under all conditions shows that Elreco Poles excel in this regard.

Catalog No. 16 contains most valuable and useful data on "Pole Engineering." Write for your copy.

Elreco Tubular Poles

Combine

Lowest Cost
Lightest Weight
Least Maintenance
Greatest Adaptability

Electric Railway Equipment Co.

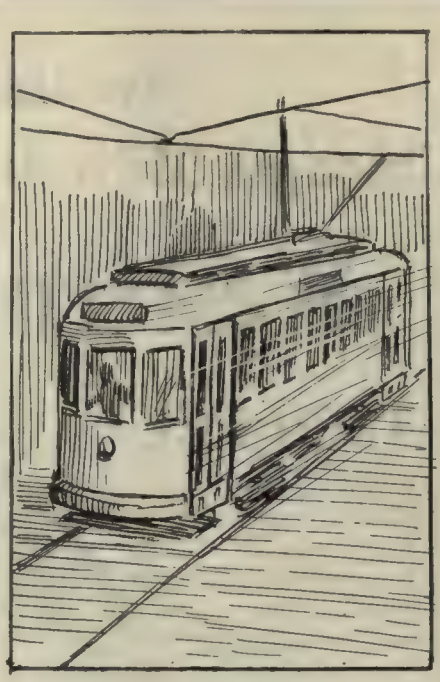
Cincinnati, Ohio

New York: 30 Church Street



Copper Wire Trolley

Cut Your Trolley Wire Replacements in Half



"Copperweld" Wire Trolley

And Save 40 Per Cent By Using

Aristos "Copperweld" Wire

Aristos "Copperweld" Trolley Wire is a wire which combines the advantage of copper for conductivity and the advantage of steel for strength.

Under like conditions of speed, headway and current collection, "Copperweld" Trolley Wire will stay up twice as long as copper—and it will show

40 per Cent Saving
In Cost of Wire and Maintenance Alone

Aside from the greater profits and better public relations which result from greater reliability of service. Write us for full information.

Western Sales Office:
Steel Sales Corporation
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Eastern Sales Office:
Page Woven Wire Fence Co.
30 Church St., New York

Made from the product of COPPER CLAD STEEL CO., Pittsburgh, Pa.
Drawn and Sold Exclusively by

PAGE WOVEN WIRE FENCE COMPANY
MONESSEN, PA.

Another Long Span in the Chicago, Milwaukee & St. Paul Electrification

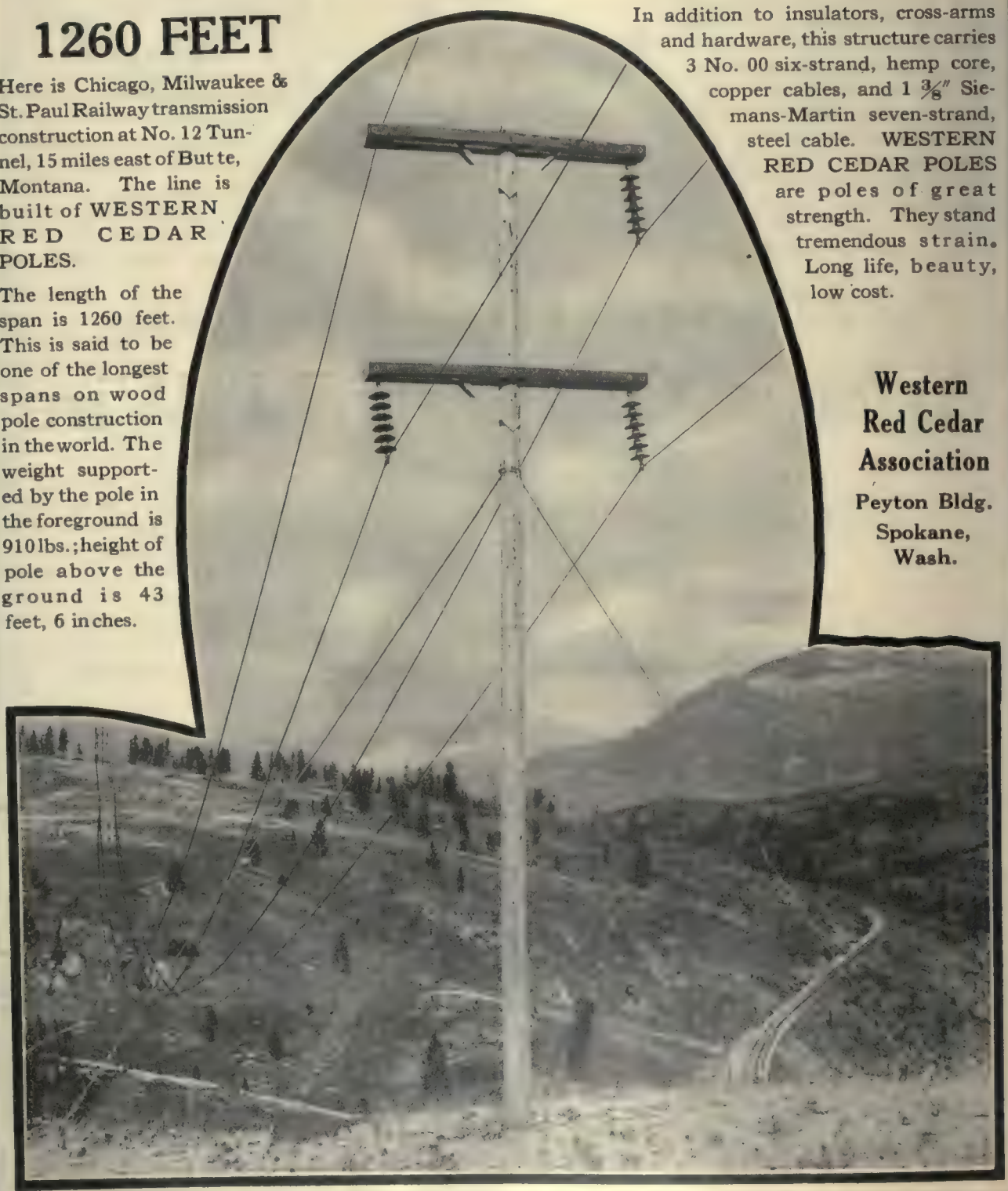
Western Red Cedar Poles

1260 FEET

Here is Chicago, Milwaukee & St. Paul Railway transmission construction at No. 12 Tunnel, 15 miles east of Butte, Montana. The line is built of WESTERN RED CEDAR POLES.

The length of the span is 1260 feet. This is said to be one of the longest spans on wood pole construction in the world. The weight supported by the pole in the foreground is 910 lbs.; height of pole above the ground is 43 feet, 6 inches.

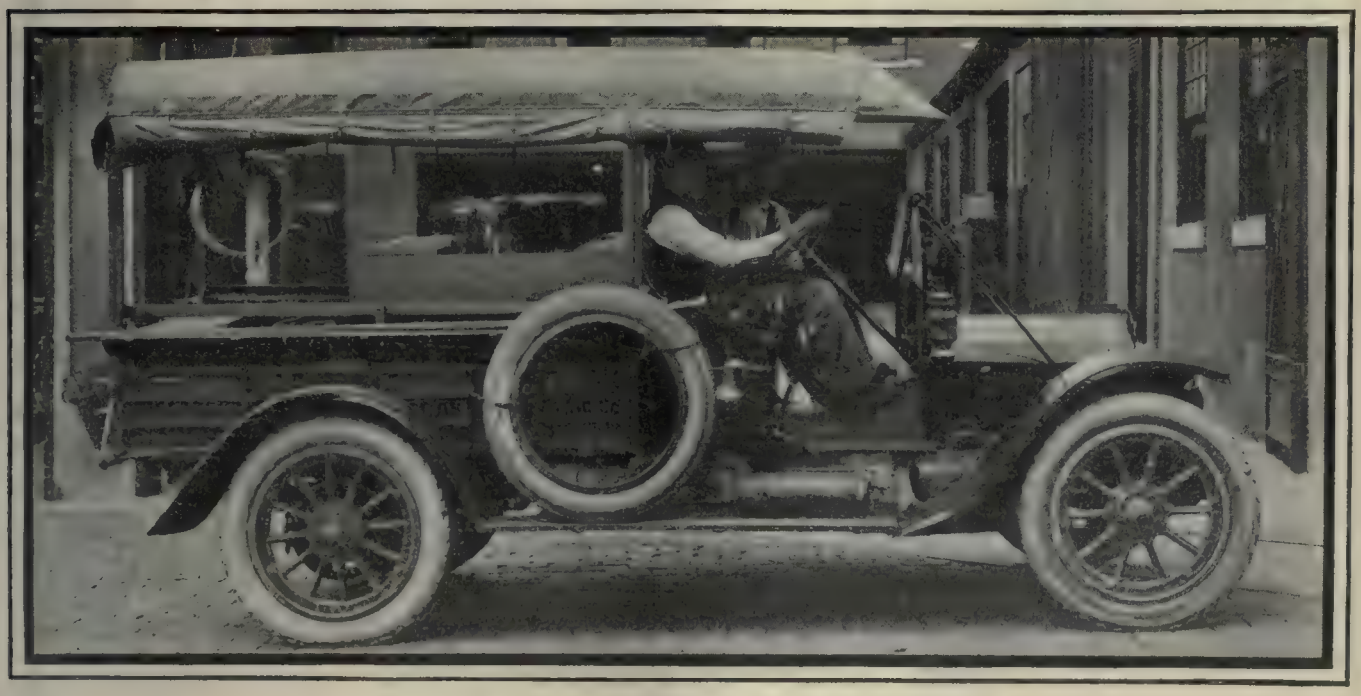
In addition to insulators, cross-arms and hardware, this structure carries 3 No. 00 six-strand, hemp core, copper cables, and 1 3/8" Siemans-Martin seven-strand, steel cable. WESTERN RED CEDAR POLES are poles of great strength. They stand tremendous strain. Long life, beauty, low cost.



Western Red Cedar Association

Peyton Bldg.
Spokane, Wash.

WHITE TRUCKS



WHITE THREE-QUARTER TON TRUCK

in the service of

THE CONSOLIDATED GAS AND ELECTRIC CO.

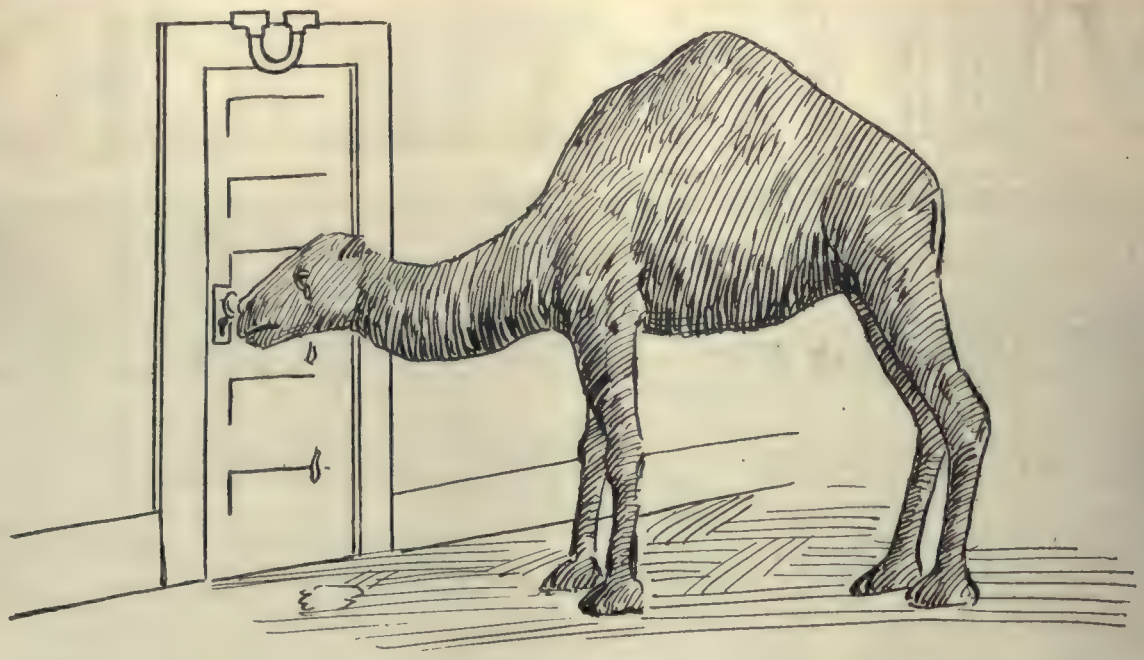
BALTIMORE, MARYLAND

THERE is no field of motor trucking where unfailing operation is more imperative than in public service work in which quick, emergency runs must occasionally be made and service to an exacting public must be given promptly. This is doubtless responsible in large part for the fact that the country's largest Electric Railway Companies, Telephone Companies, and Electric Lighting Companies continue year after year to re-order White Trucks in greater numbers than any other make of truck.

THE WHITE COMPANY

CLEVELAND

Largest Manufacturers of Commercial Motor Vehicles in America



Camels Can't Squeeze Through Keyholes

The evident disproportion between the Camel and Keyhole is the obvious reason

Corrosion Can't Squeeze by

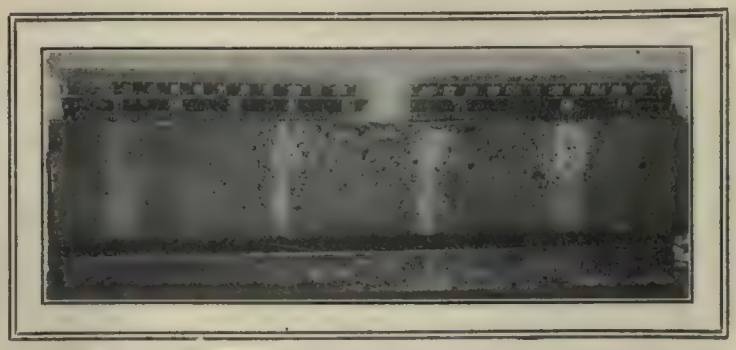
ERICO BONDS

The absolute *weld*—not *stratification*—of the Erico Bond and the rail is the obvious reason

The Electric Railway Improvement Co.

Cleveland, Ohio

To Correct THIS ⟶ Condition Requires *Accurate* Grinding



The illustration is from an unretouched photograph of a rail which has been attacked by corrugation.

A comparison of the corrugations in the rail-head, with the straight edge of the rule, graphically indicates how necessary it is in grinding out such defects to have a machine which will do *exact, accurate* work.

The Reciprocating Track Grinder does that kind of work

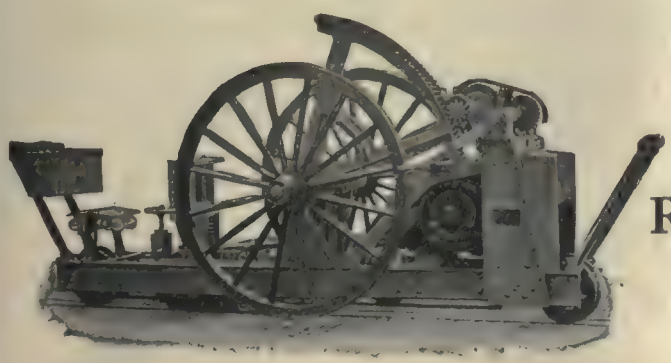
If the grinding is not done with accuracy so as to leave a perfectly smooth surface, the slight inequalities which remain are just as bad as incipient corrugation, and the work has to be done all over again in a comparatively short time.

The only true economy is to do the job right the first time.

The Reciprocating Grinder not only does the work right, but it produces this exact result without any necessity for skilled and expensive labor in the superintendence of the job.

You can easily verify all of these statements by asking any of the railway companies using the Reciprocating Grinder about the quality of the machine's work when used by common labor.

Or you can verify it by putting a machine at work on your own tracks without any obligation upon you to buy it if you are not entirely satisfied with its value to you.



Railway Track-work Co.
30th and Walnut Streets
Philadelphia



Making the Weld



Pre-heating the Mold



Luting the Mold

Dallas, Texas, has a 100 per cent Return Circuit

The Consolidated Electric Street Railway Co. of Dallas, Texas, has recently made its return circuits on several lines electrically and mechanically perfect by joining the rail-ends with

The Thermit Insert Weld

The illustrations show the work in progress. There is no doubt about the Thermit weld lasting as long as the rail—because it actually is the rail.

Once installed, it is there to stay—no costly reopening of street paving for rebonding—no uneven rail-joints to cause expensive grinding—no expensive re-routing while rebonding is being done—

Just a return circuit of 100 per cent conductivity—a return circuit immune to electrolysis and all the other ills met by ordinary bonding systems.

GOLDSCHMIDT THERMIT CO.

120 BROADWAY, NEW YORK

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Rapid, Effective, and Lasting Work

in the installation of drainage structures for steam and electric railroads is accomplished by the use of



"ARMCO" IRON CULVERTS

The upper illustration is of a 60-inch corrugated pipe, 82 ft. long, made from 10-gage "Armco" Iron, being installed under the tracks of a great interurban railroad. Note the bevelled end to conform with the line of the end-wall.

The lower picture shows twin 18-inch culverts of the same material.

"Armco" (American Ingot) Iron, the product of the American Rolling Mill Co., is the standard for purity and rust-resistance. Its adoption has made of the corrugated culvert a reliable and *lasting* installation.



AMERICAN ARMCO INGOT IRON

Resists Rust

Write or phone the nearest manufacturer for full information as to "Armco" Iron Culverts, Siphons, Flumes, Sheets, Roofing and Formed Products.

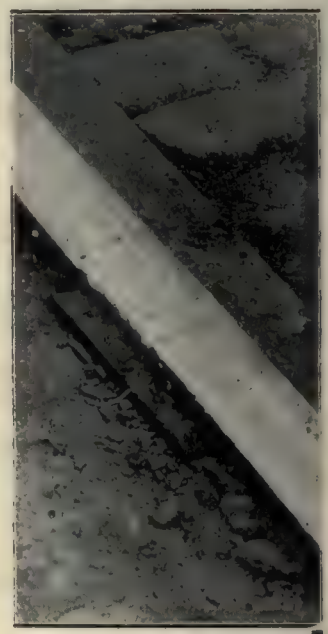
Arkansas, Little Rock
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California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
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W. Q. O'Neall Co.
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Indianapolis "Simplex" and "Apex" Joints

have hit the bull's-eye from the start

They were bound to! You can't beat the combination of long service and low cost.





Here are the figures that tell

Perfect Joint Installed Complete—$3.75

Appearance After 3 Years' Heavy Service

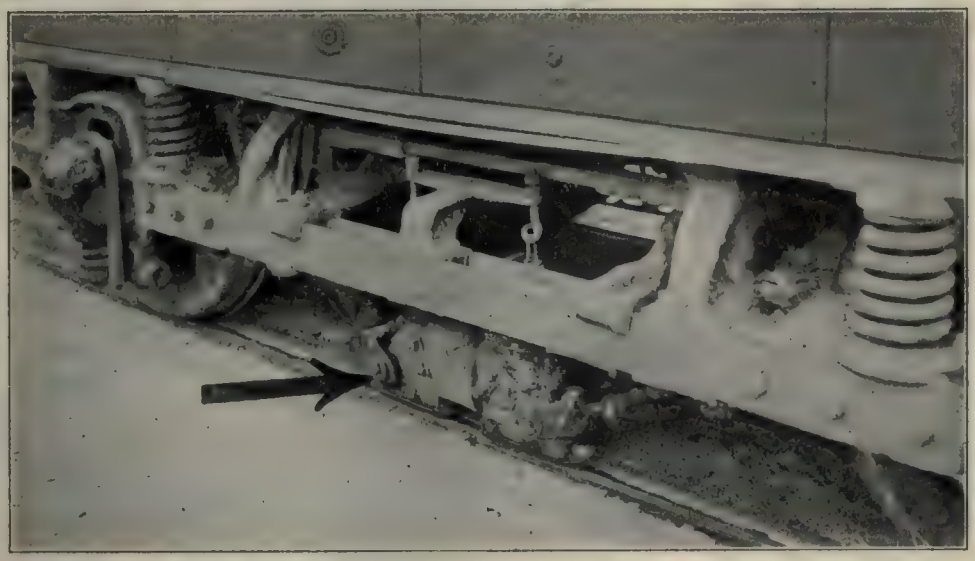
1912 ——
1913 ——————
1914 ——————————
1915 ——————————————————
1916 ——————————————————————
1917 ?

You can carry your old track over—till prices and deliveries are normal

Indianapolis Switch & Frog Co.

New York **Springfield, Ohio** **Chicago**

D & W Deltabeston Wire



As Good for Brake Solenoids as for Railway Motors

Pittsburgh is one of several American cities with steep hills where a number of magnetic track brakes are used.

Necessarily, the magnetic brake solenoids run very close to the paving, so that they were subjected to frequent burnouts

From mud, slush and snow, as well as from excess currents on down grades.

Fine Service with Deltabeston-ed Motors

led the Pittsburgh Railways to rewind these magnetic brake solenoids with Deltabeston instead of cotton covered magnet wire.

Result—Practical elimination of baked coils and assurance of Pittsburgh's slogan—

Safety Always

D & W Products—Deltabeston—Deltatape—Delta Sheeting—Fuses—are the best insurance for maximum safety under the most arduous conditions of operation.

DELTABESTON WIRE REG. U.S. PAT. OFF.

D & W FUSE CO.

PROVIDENCE, R. I.

A. Hall Berry, 97 Warren St., New York

D&W REG. U.S. PAT. OFF.

Agents—Pettingell-Andrews Company Western Electric Company Central Electric Company



Columbia Taping Machines



Are Used to Make Columbia Coils

Just a pictorial reminder of the fact that we make coil-taping machines.

You can see we believe in them for we use them ourselves in our own coil manufacture!

Whether you buy coils or make them, Columbia service is at your elbow.



COLUMBIA TAPING MACHINES ARE USED TO MAKE COLUMBIA COILS

Observe our extensive list of shop tools in addition to our other specialties:

TOOLS

Armature and axle straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and field coils
Brush-holders and brush-holder springs
Brake, door and other handles
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Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail contact-shoes and accessories
Trolley poles (steel) and wheels



Columbia Machine Works & Malleable Iron Co.

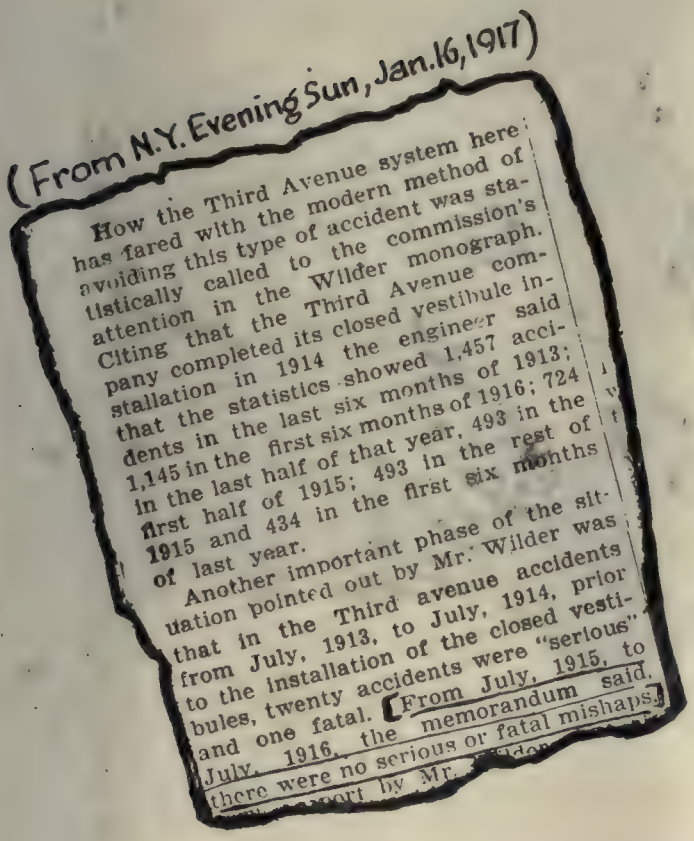
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco



Boarding and Alighting Accidents for Six Month Periods Reduced from 1457 to 434

These Figures are Official


(From N.Y. Evening Sun, Jan. 16, 1917)

How the Third Avenue system here has fared with the modern method of avoiding this type of accident was statistically called to the commission's attention in the Wilder monograph. Citing that the Third Avenue company completed its closed vestibule installation in 1914 the engineer said that the statistics showed 1,457 accidents in the last six months of 1913; 1,145 in the first six months of 1916; 724 in the last half of that year, 493 in the first half of 1915; 493 in the rest of 1915 and 434 in the first six months of last year.

Another important phase of the situation pointed out by Mr. Wilder was that in the Third avenue accidents from July, 1913, to July, 1914, prior to the installation of the closed vestibules, twenty accidents were "serious" and one fatal. From July, 1915, to July, 1916, the memorandum said, there were no serious or fatal mishaps.

They are from a monograph submitted January 16, 1917, to the Public Service Commission, First District, New York, by C. W. Wilder, its electrical engineer.

Not one serious accident in a whole year!

Yes, all cars of the Third Avenue Railway System, New York, are equipped with the National Pneumatic Company's Manual Door and Step Control and Electric Interlocking Safety Door Control.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York

515 Laflin St. Chicago

V-K
NON-ARCING
—HARP—



A—Bronze Lock Nut. B—Hollow Steel Case-Hardened Lubricating Shaft. C—Cotter Pin. D—Rivets. E—Steel Adjustment Screws (Right and Left). F—Bronze Contact Spring. H—Cotter Pin Hole. K—Expanding and Contracting Slot.

THE use of the V-K NON-ARCING HARP prevents all arcing due to loose-fitting axle-pins, because it is equipped with a patented gripping device which locks the pin securely in its socket. This checks destructive wear, greatly improves current flow and lengthens the life of both trolley equipment and overhead.

Send for illustrated catalog

MORE-JONES BRASS & METAL CO.

ST. LOUIS, U. S. A.



Here's an Example of HESS-BRIGHT SERVICE!

Hess-Bright Ball Bearings in this mountain car have been making good since 1909—and they are still "going strong!"

Back in December, 1909, the Mt. Tamalpais & Muir Woods Railway—the famous road opposite San Francisco—bought a twenty-passenger car fitted with a 60-hp. four-cylinder gasoline engine.

After years of passenger service it became a work car. Overhauled in 1916, the chassis and the

HESS-BRIGHT BALL BEARINGS were found in good condition

Today, the same apparatus (with same bearings), but with a new body, is in regular passenger service again, on the crookedest railway in the world—a railway with grades up to 8 per cent and curves down to 70 ft. radius.

THE HESS-BRIGHT MANUFACTURING CO.

FRONT ST. AND ERIE AVE., PHILADELPHIA, PA.


COLLIER SERVICE
YOU
are cordially INVITED to INSPECT our
NEW CENTRAL PLANT
CANDLER BUILDING
220 W. 42nd. St.
NEW YORK CITY
CAR ADVERTISING ALMOST EVERYWHERE
Barron G. Collier
INCORPORATED

Here's the Point—

where you want the Material Dumped.
Not half of it over the track.

The Differential Electric Dumping Car

places its contents well away from the track leaving a clear road for operation. Cars are built entirely of steel, and a small individual motor for each car enables an entire trainload to be dumped safely by a single unskilled laborer.

The body is very low and light and can be loaded while in tilted position, permitting easy shoveling and much saving in labor.

Invest in a train of Differential Electric Dump Cars—and watch your construction expenses dwindle.



Write for Bulletin No. D3, and be convinced.

Differential Car Co., Inc.

Southern Office and Works, Nashville, Tenn.

141 Broadway, New York

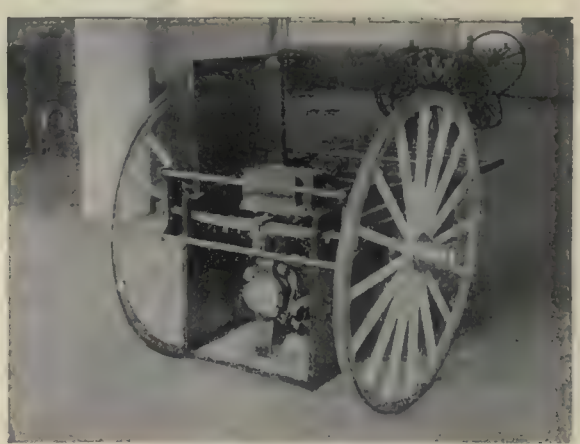
Easy to Handle and Handles the Work Easily

—that is why the

Lincoln Bonding System

enables two men to install bonds at the rate of 30 per hour. Any road equipped with a Lincoln bonding machine can rapidly install bonds that will insure a return circuit of maximum conductivity.

No drilling, no grinding. The electric arc throws off the scale, rust or dirt, and leaves a clean welding surface.



Something New!
A Lincoln Bonding Machine fully equipped, mounted on a two wheel cart. It's ready when you want it.



The fact that we have saved from 20 to 50 cents per bond for others proves that we can do the same for you.

—the greater your mileage, the greater will be your saving. We will gladly send further details.

The Lincoln Bonding Company

636 Huron Road, CLEVELAND, OHIO

AGENTS:

LEWIS & ROTH COMPANY
1012 Liberty Bldg., Philadelphia, Pa.
114 Liberty Street, New York City, N. Y.
CHARLES N. WOOD COMPANY,
14 Federal St., Boston, Mass.

A Modern Achievement!

The perfection of a "system" of car operation, which guarantees safety and economy to a greater degree than heretofore possible, has been attained by the development of a combination of the well-known Westinghouse Traction Air-Brake and our Safety Control Equipment.

The system embodies efficiency in operating requirements to such an extent that control of the car and handling of the passengers is accomplished in a most reliable and simple manner by the use of Pneumatic Devices Automatically Operated.

CONTROLLER HANDLE

If inadvertently released by operator, power is cut off, brake applied and front door opened.



View of platform of light weight car controlled by one operator showing simplicity of installation

BRAKE VALVE

An additional position permits simple manipulation of the door and step from the one handle.

STARTING — RUNNING — STOPPING
OPERATING DOORS AND STEPS
TWO HANDS—TWO OPERATING HANDLES

Let us show you how to secure these features for your service.

SAFETY CAR DEVICES COMPANY

MAIN OFFICE

ST. LOUIS, MO.



Vancouver, B.C.

232 Rico Coasting Recorders Showed the Slack in the Line at Vancouver, B.C.

The one big fact to bear in mind about the Rico Coasting Recorder is that it reveals the ultimate operating possibilities of any line on which it is used. Thus its Rico Coasting records showed the British Columbia Electric Railway without further investigation that enough slack could be taken up in schedule speeds on the city lines of Vancouver to permit effective competition with jitneys by increasing the number of stops.

This revelation followed naturally from the fact that the ratio of coasting time to running time is a concrete expression of



The True Principle for Measuring Operating Efficiency

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



Prevention is Better than Cure

The G-E Type S, Form L-1, Motorman's Valve has a steel stem case-hardened at the handle seat. The handle also has a case-hardened head.

Although the different parts of the valve are easily renewed, a greater advantage still is the fact that they **rarely require** renewal.

Prevention of wear is better than buying repair parts to **cure** it.

The Form L-1 Valve Cuts Your Cost of Upkeep

General Electric Company

General Office: Schenectady, N.Y.

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*Southwest General Electric Company. †General Electric Company of Michigan

For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.

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Electric Railway Journal

Published by the McGraw Publishing Company Inc.
Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLIX NEW YORK, SATURDAY, FEBRUARY 3, 1917 No. 5

REDUCING THE TRANSFERS

It has been well said that the steam railroads have an advantage over the urban electric railways in the ease with which they can raise fares. The electric roads not only have to make a jump of 20 per cent from 5 cents to 6 cents, but they have to substitute an inconvenient fare for one which is not only convenient but has been in use so long that everyone has become accustomed to it. To avoid this objection the zone system and a charge of 1 cent for transfers have been suggested, but each plan has certain disadvantages. Still another plan is to reduce the number of places at which transfers are permitted. It is a fact which can be verified from the schedules of almost any large company that under the existing transfer system many rides are possible at an absurdly low charge per mile. We admit that any individual case is apt to be complicated by the existence of through routes, requirements in the way of service on connecting lines, etc. Nevertheless we believe that it would not be difficult to devise a transfer system which would grant the privilege to the short rider only on the through route, and to decline it to the long distance passenger, if such a plan was legally permitted. Most roads in the past have been so over-generous with transfers that we believe the commissions might look with favor upon this method of increasing fares, should a definite plan be devised which would be practicable for each particular case.

PROHIBITION AND THE CITY RAILWAYS

Iowa went "dry" last year—long enough ago so that the residents of this wealthy farming state may begin to determine the results. It seems a rather remote step from prohibition to the street railways, yet they appear to be sharing in the net returns. In Des Moines, for instance, there has been a noticeable increase in the amount of evening traffic on the city cars. This is attributed to the effect of the law, and incidentally indicates that the moving picture theaters are conducive to greater transportation earnings than the saloons. Many men who formerly stopped at the corner bar on their way home from work and spent a dime or 20 cents are now going directly home and then coming back downtown after supper and bringing their wives and perhaps their children to see a picture show. Where the street car company formerly received a nickel from them to carry them home, it now earns an additional 20 or 30 cents. Human beings will have amusement, and if the bottle variety is lost to common usage, the movie is often the more wholesome entertainment to which they will turn, and the railways profit by the change for the better.

THE MILWAUKEE'S LENGTHENED ENGINE DIVISIONS

In our first issue of the current year mention was made of the promising outlook for new steam-railroad electrifications, and the first of the projects which were germinating during the past year has already taken definite form. This is the plan for extension of electric operation on the Chicago, Milwaukee & St. Paul Railway to the west of the present electric zone. According to the report, which is outlined on another page of this issue, the 220 miles of electrified track included in the immediate program will extend over the two engine divisions east of Seattle, leaving a gap of about an equal distance between the new zone and the Western terminus of the existing one. The primary object, obviously, is the provision of electric power over the Cascade mountains, leaving the comparatively level line across the fertile plain of Eastern Washington to be served by steam. In the latter region, of course, the need for the economies of the electric locomotive is less emphasized, but that the gap will be closed within a relatively short time goes almost without saying. What the Milwaukee road has done is the demonstration, on a gigantic scale, of the savings to be effected by long-distance operation of electric locomotives, and the results, while not available in actual figures, have been shown to be successful by the mere fact of the present plan for an extension of the system. During the past year of trial the economies have been obtained with electric locomotives running over engine divisions only twice as long as under steam operation, and the possibilities that will exist for cutting out terminal losses, when the whole 900 miles of line are electrified and permit still longer runs, are fairly staggering to the imagination.

PREPARING FOR LABOR CONFERENCES

On a certain electric railway the representatives of the employees' union conduct careful rehearsals before sitting down at a conference with company officials. One set of delegates takes the men's side; another set puts itself in the places of the company officials, and the pros and cons are debated with red-hot enthusiasm. This is a form of preparedness that might well be practised by railway officials as well. The energy and time expended by company representatives in considering the issues from every angle would be used to an exceedingly good end. The outlining of the company's side in debate would unquestionably tend toward a better understanding of its position in the subsequent negotiations, and the more that was done to secure the viewpoint of the employees the more likelihood there would be of a prompt and just settlement. In other words, we are inclined to think that a well-prepared and

able management could secure concessions from a well-prepared union delegation that could not be obtained by unprepared officials in dealing with an ill-informed group of employees. Of course, the well-prepared group will do its best for its cause, but the basis of negotiation is certainly improved with fuller knowledge gained from discussion and close application to the conditions of each problem.

A FUNDAMENTAL OF WOOD PRESERVATION

A note was sounded throughout all of the sessions of the Wood-Preservers' convention of last week to the effect that treatment of timber, to be successful, must be accompanied by proper handling of the wood before and after treatment. To the layman attending technical sessions of a highly-specialized industry the expression of such an elementary formula is interesting, but it is at the same time surprising enough to make a very definite impression. It appears that not even wood preservers have universally recognized the inability of any commercial process of preservative treatment to stop decay that has once gained a foothold. The application of preservatives merely establishes a protective covering around the outside of the stick, and if this covering is interrupted at any point or surrounds a decayed spot that may subsequently spread its infection from within, the treatment is merely a waste of money. In practical application this principle demands that timber, as soon as it is cut, must be stored in a clean, dry spot and must be piled so that air has free access to all sides of every piece. In fact, a stick of wood seems quite as subject to contagious disease as any mammal and must be protected from the attacks of germs with equal or even greater care. After treatment the same rule applies, and if the treated timber is sawed or bored and the untreated interior exposed, decay will follow just about as fast as if no preservative had been applied. This fundamental principle is, apparently, more often violated than any of the general rules in timber preservation, and from this cause, no doubt, come a majority of the apparently inexplicable cases where treated wood fails to last in service.

DEVELOPMENT OF TRAFFIC

There are two ways of increasing the net earnings of any company. One of these is to increase the gross receipts; the other is to decrease the operating expenses. Under present conditions, the former seems the more practicable, and it is the plan urged by four traffic managers who contribute to a symposium this week on the "Development of Traffic."

It is obvious that any electric railway devoted purely to passenger business, especially that traffic which comes from absolutely necessary riding, has a low service factor, and almost any way in which this factor can be increased means greater net receipts. The investment in track and for right-of-way, in the case of an interurban road, is a very large proportion of the total investment on every road, but if this property is idle, or practically idle, for from six to twelve hours during the twenty-four the railway is not making the most of its opportunities. This is the great argument in favor of greater traffic development, especially in the direction of less-than-carload freight, which can be hauled during those times when the power station and track would otherwise be practically unused.

The business is one which, of course, has its own characteristics. It must be developed along different lines than the haulage of passengers, and to secure the best results some additional investment is necessary in the way of equipment, and some more is desirable in the way of terminals and perhaps for sidings and cut-offs. But such investment is small compared with that in the entire plant, and by a judicious selection of the kind of freight to be solicited so that it will include that on which the highest rates are paid, most companies should be able to develop a satisfactory additional income. Just what to do and how to do it form the subject of the articles already mentioned, and we believe that the testimony there given as to results which have been secured on the four roads concerned should be of value to many companies.

STATE TAX FOR CITY-OWNED LINES

The California State Board of Equalization, as mentioned in a news note last week, has made a recommendation that has quite an important bearing upon the question of governmental fairness to privately-owned utilities in California. In short, the board urges the enactment of a law by which municipalities owning and operating public utilities shall be required to report to it and pay a tax on gross operating revenues similar to that imposed on privately-owned companies. This proposal has special application to the electric railway field on account of the municipal lines operated in San Francisco. It should be understood, of course, that the lack of such provision heretofore has not served to inflate the net profit of the municipal system, for although it pays no taxes it is required by charter provisions to take into account charges for taxes, city interdepartmental work and insurance, so as to make possible a comparison of its results with those of private operation. For example, the latest complete report of the municipal lines includes in income deductions an item of $86,029 for the State franchise tax of 5¼ per cent upon gross operating revenue. This tax has not been paid to the State, however, and this fact, in the opinion of the Board of Equalization, throws an unfair burden upon people in other parts of the State.

As we understand it, the authorities on taxation in California are now somewhat uncertain as to whether special legislation of this kind is necessary. The general tax law provides that all "properties" owned by the State, counties and municipalities are exempt from taxation, but five years ago an amendment was passed to the effect that all utilities of designated kinds are to be taxed by the State on the basis of gross operating revenue. In other words, municipally-owned utilities are not specifically exempted. It might, therefore, be legal simply to levy the State tax on the municipal utilities, but this might involve long litigation as to the intent of the lawmakers, which the direct passage

of a new bill would avoid. Certainly there is no sound reason why the municipally-owned utilities should not bear their just proportion of the State tax, and with the equity of taxing them irrefutable the law should be made specific to this effect.

ACCIDENT PREVENTION VIA THE GENERAL MOVIES

Moving pictures have played a most important part in many recent accident prevention campaigns exemplifying the value of the safety-first idea. Such displays have stimulated interest among street railway employees, their families and friends, and the good which ocular evidence of the penalties of carelessness has effected cannot be measured. The wisdom of prevention through every possible agency needs no demonstration, and it is such a wholesome thing that even the general moving-picture houses are willing to devote some of their "footage" to this good cause.

From the standpoint of the operating man, however, it is desirable that any demonstrations of the dangers of boarding cars when in motion, alighting while facing the wrong way, holding bundles improperly, failing to look out for cars and automobiles on either side of the street center line, etc., shall be not only technically correct from the railway aspect of the case, but that the maximum impression shall be made on the observer. In a photoplay display recently viewed which has the laudable object of warning the public against its own carelessness in street car use, the "play-up" of the accident in almost every case was so weak as to give the onlooker the impression that only trifling injuries result from carelessness or a criminal disregard of the rights of others on the street. The apparent victims in practically every instance appeared to suffer little more harm than black-and-blue spots and generally walked away from the scene with surprising alacrity.

No sensible operating man wishes to overdo the job in demonstrating the dangers of certain practices on the part of the public, but there is room for some useful co-operation between the "movie" director and the transportation man in properly staging such scenes. If a boarding accident is to be depicted, it is better to use a type of car permitting entrance while it is in motion than to attempt to illustrate the affair by a piece of rolling stock which has been specially designed to prevent precisely this kind of accident, and which, in fact, makes boarding while the doors and steps are closed almost an impossibility. Then, too, the resources of the camera man in adjusting the speed of cranking the film to the requirements of the particular illusion sought should enable more realistic speed and tumbling effects to be attained in the illustration of some kinds of accidents, notably those resulting from the failure to look for the oncoming car or motor-vehicle in the opposite direction to that previously taken, and this without exposing the actors to increased personal risk. And finally, when the accident is depicted, would it not add much to the value of the film to include one or two hospital and convalescence scenes to clinch the impression of the price paid for carelessness?

In the industrial field, moving pictures of accidents often go so far as to show the permanent injuries received through heedlessness and perhaps hint at lifelong disabilities and hindrances. Certainly the general public needs to be fully warned of the perils of a carelessness which no railway company can control outside its own ranks and which adds so much yearly to the burdens of operating men from the humblest switchman to the highest executive. Thus far, the connection between the electric railway industry and the moving-picture world has been of a pioneer character, but the future is likely to witness a closer relationship as the demand for industrial and pseudo-scientific backgrounds for scenarios increases and as railway managers realize the immense power for suggestion resident in the modern film.

ANOTHER ADVANCE MADE

Gradually the New York courts are interpreting the public service law and in so doing are confirming the title of the commissions to wide discretionary powers in increasing as well as decreasing utility rates, even when such increases are counter to existing statutes or municipal agreements. Some time ago, it will be recalled, the New York Court of Appeals declared in the Ulster & Delaware case that the Second District Commission had power to raise the mileage book rate from 2 cents per mile which had been deemed sacrosanct.

Now, under a decision by the Appellate Division of the Supreme Court, the same commission has been told that it should not be estopped by local franchise provisions from fixing reasonable rates. In 1915, as explained elsewhere, the commission denied the petition of the New York & North Shore Traction Company for a fare of 15 cents, on the ground that the municipal consent for construction stipulated a 10-cent fare and no increase could be made without the consent of the local authorities. This, the court now holds, is not true. Although the constitutional provision in New York requiring municipal consent for franchises is a restriction upon the Legislature, the constitutional clauses regarding legislative power over rates and the delegated commission power over rates form a restriction upon local authorities in regard to attaching conditions to fix the rates. Thus, although in practice a fare might be agreed upon by utility and municipality in instituting service, the public service commission law provides for the later adjustment of such fare up or down as reason and justice demand. This is as it should be, for to determine fair rates is not the proper duty of either party directly concerned but of the impartial body to which the Legislature has delegated its power.

By a singular coincidence we are this week again calling attention to the remarkably well-equipped and conducted organization of the very commission concerned in these cases. This organization will undoubtedly be of great assistance to the commission in fulfilling its duty of complete regulation along the line now indicated by the court. Hereafter, we are sure, the commission will feel more self-assurance as to its power of determining all rate questions according to the merits of each particular case.

How a Commission Works

With a Description of the Divisions of Statistics and Accounts, Capitalization and Tariffs and of the Central Clerical Office, This Article Concludes the Story of the Public Service Commission for the Second District of New York

FOR the purpose of showing the extent to which the machinery of regulation has been thus far developed in this country, the ELECTRIC RAILWAY JOURNAL began in its issue of Dec. 30, 1915, a description of the organization, cost and work of the Public Service Commission for the Second District of New York. This first part, however, covered only those organization units consisting of the three leading groups—the commissioners themselves, their legal and confidential staff, and the administrative division—and the five groups that supervise grade crossings and separate classes of utilities, *viz.*, electric railways; light, heat and power companies; steam railroads, and telegraph and telephone companies. There are four other groups, which are in general concerned with all classes of utilities. These—the divisions of statistics and accounts, capitalization and tariffs, and the central clerical office—are described in this second and final part of the article.

DIVISION OF STATISTICS AND ACCOUNTS

The personnel, general duties and salaries of the officials in the division of statistics and accounts are as follows:

Title	Duties	Salary
	ADMINISTRATIVE GROUP	
Statistician in Charge:	General supervision, planning, correspondence and technical review	$5,000
Assistant Chief Statistician:	Assistance in supervision and in critical examinations devolving upon staff shown under second group	2,400
	CRITICAL EXAMINATION GROUP	
Telephone Accountant:	Examination of reports of telephone and other corporations	2,500
Junior Statistician:	Examination of reports and care of miscellaneous related routine, as well as tabulation work which ordinarily devolves upon the second group	1,800
Assistant Examiner:	Critical examination of reports and revision of forms	1,800
Junior Accountant:	Critical examination of reports	1,500
Bookkeeper:	Critical examination of reports and assistance on tabulations	1,500
	TABULATION GROUP	
Statistical Clerk and Assistant Examiner:	Tabulation of results of critical examinations and assistance in examination work	1,080
Clerk:	Examination of reports and related detail in connection with tabulations	1,080
Clerks (2):	Examination of reports and related detail in connection with tabulations	900
	CLERICAL ROUTINE GROUP	
Stenographer:	General supervision of clerical routine and other necessary details	1,800
Stenographers (2):	Stenographic routine, including typing of tables, etc.	1,200
Clerk:	Typewriting, operation of comptometer, copying, etc.	1,080
Clerk:	Filing correspondence and other clerical routine	900
Index and Filing Clerk:	Filing correspondence and other clerical routine	900

The foregoing groups represent reasonably distinct sections charged with the performance of the classes of work indicated. Changes in the assignment of employees, however, from one class of technical work to another is of almost daily occurrence, thus making possible the training of all-around men.

The division of statistics and accounts is charged with the examination of periodical (*i.e.*, annual and special) reports required from utilities. This work falls under the following natural heads: the formulation of classifications, accounting forms, interpretations and instructions to govern the preparation of corporation reports; the critical examination of such reports to see that the rules are followed; the tabulation work for commission statistical reports; the publication of these reports and the general furnishing of information, and clerical and business routine.

1. *Formulation of Classifications, Etc.:*

The scope of the work under this head can be judged by a glance at past developments. Since the formation of the commission the head of the division of statistics and accounts, acting in conjunction with the heads of other divisions, has prepared numerous regulations and forms that have been sent out to utilities and other interested parties. Among the pamphlets of instructions sent to corporations are those dealing with the uniform system of accounts for electrical, gas, telephone and electric railway corporations. Official classifications and forms covering electrical and gas corporations, natural gas corporations, telephone companies, telegraph and cable corporations, steam railroads and electric railways have also been sent out. Besides such general work the division stands ready at all times to interpret its rulings, etc., for individual companies.

2. *Critical Examination of Corporation Reports:*

The first point of interest in connection with critical examination work is, of course, the requirements of the commission in regard to the submission of reports by the utilities within its jurisdiction. The rules with respect to the time and the manner of sending in reports may be indicated simply as follows: Annual reports on prescribed forms from all corporations, and quarterly reports on prescribed forms from steam railroads. The quarterly reports are regarded as a supplementary requirement, each steam railroad being compelled to submit an annual report as well. For this reason, the examination of quarterly reports includes only certain elements of the examination of annual reports.

There are four well-marked steps involved in the examination of annual reports, the first two being of a rather preliminary nature. The first step involves a mechanical comparison of the basic figures of the report under examination with the totals of the preceding year's report. The second step consists in verifying additions, subtractions, multiplications, etc., in the new report, being thus a purely mathematical checking to determine accuracy. The first advanced step is a cross-check of analogous items in different financial statements to determine their correspondence. For instance, items on a balance sheet are checked with the totals of the several supporting schedules. As the examination progresses, corrections are made on a form designated

as "memorandum of errors," which contains captions facilitating the entry of facts "as reported" and as the examiner thinks they should be. This form is reproduced on page 198. The second and last advanced step is the critical examination itself, which may include a preliminary and a final review or only one examination. In either case the intention is to summarize the errors and discrepancies discovered and to prepare a report to the corporation at fault.

3. *Tabulation Work for Commission Statistical Reports:*

The third class of work covers the classification and tabulation of the results of the examinations in the form of an abstract, which is the basis of the commission's statistical reports. As in the examination of the reports, there are certain well defined steps to be followed. The first is the preparation of the original tabulation, which involves the drawing-off of figures from the annual reports of distinct classes of corporations upon improvised financial statements agreeing in classification with the forms used by such corporations. Unimportant financial data, of course, are not abstracted. The second step is the verification of the original tabulation by checking back the items to the reports to determine the correctness of the posting. The next two steps are the verification of all computations on the tabulation itself, and the comparison of analogous items in different tables to obtain a cross check. After these comes an important feature of the work, the preparation of notes to explain items on the abstract that are of doubtful meaning. The last step is that of typewriting and checking the tables. These steps are also followed in the abstracting of quarterly reports, but the process is abbreviated because of the limited scope of the examination.

"BEHIND THE SCENES"

An editorial under this title, published in the ELECTRIC RAILWAY JOURNAL of Dec. 30, urged utility operators to learn regulatory practices as well as theory. They should not, it was said, confine their attention to the words of the principals in the limelight, the commissioners, but should be acquainted with the diversified work behind the scenes. To this end an article was presented on the same date to show how the many assistants of the commissioners for the Second District of New York set the stage for the regulation of each class of utility. Now, in addition, this journal is taking its readers to the "property room," where the accumulated records and data of the commission are held ready for instant use. A remarkable system it all is—utility officials should not miss the opportunity to see it.

4. *Publication of Commission Statistical Reports and Furnishing of Information:*

The actual printing of commission statistical reports and all mechanical details relating thereto are referred to later under the central clerical division of the commission's organization. The work done under the division of statistics and accounts relates only to the final preparation of reports as a basis for printing. The furnishing of information by this division, however, consists of compiling statements in tabular or other form as a basis for submission to corporations or other parties, furnishing personal assistance to those who call at the office to inquire about the financial condition of corporations in which they may be interested, forwarding printed or manuscript material for information purposes to the public generally, and assisting the other divisions of the commission by making its information available to them.

5. *Clerical and Business Routine:*

The last section of the division's work concerns the clerical and business routine of its office. This, in general, falls in the following groups: Handling and filing correspondence other than reports; handling and filing report material; stenographic and typing routine involved in the preparation of reports, and correspondence.

DIVISION OF CAPITALIZATION

The division of capitalization is engaged almost exclusively in the examination of books, papers and records of companies asking for authority to issue securities. A utility presents to the commission an application stating in detail how the money is to be used, and from this application a preliminary analysis is made. If the matters involved are varied and complicated, the commission holds a preliminary hearing to learn fully what the directors of the utility propose to do. After this hearing, the case is referred to the division of capitalization for examination. Its investigation involves, when necessary, a thorough examination of the transactions of the corporation during the entire period of its existence. While this is going on, an inventory of all property is required from the utility, and the examiner analyzes this with the view of identifying the particular items of property which are shown on the books as having been acquired and included in the capital accounts. After the work of examining the records is finished, the inventory is turned over to an engineer in the proper division, who makes an appraisal and reports thereon. The results are all combined in a final report showing the actual condition of the corporation. This is submitted to the corporation, which then signifies its assent or makes its objections. If necessary, a hearing is held in the matter. If the securities are authorized, the division follows up the case so that it can tell at any time the amount of authorized securities sold and the application of the proceeds thereof to dates within six and three months respectively.

The leading employee in the division of capitalization is the chief ($4,000), under whom is the senior examiner ($2,500), one examiner ($2,250), one examiner and one examiner of accounts ($2,000), four examiners ($1,800), two assistant examiners of accounts ($1,500) and two assistant examiners ($1,080). Besides these, there are a junior accountant ($1,080), two stenographers ($1,200 and $1,080) and two copyists ($900 and $600). The chief analyzes petitions referred to the division, supervises and directs the examiners in the field, and prepares reports embracing the results of such examinations. The senior examiner, the examiner of accounts and five other examiners make detailed examinations of the books and accounts, verify liabilities by comparison with the original vouchers and documents, eliminate unnecessary items and redistribute the accounts as required by the official classifications. They also prepare correct financial and statistical statements, make detailed lists of property for inspection by the commission's engineers and report in detail on each company examined. It is customary to assign any one of these examiners to a particular case, with assistants as necessary. To one of the examiners of the $1,800 class is assigned the special duty of supervising the stenographic preparation of reports, recording them and compiling data for the commission's orders. The

four assistants and the junior accountant do the minor part of the work, such as checking, verifying schedules, examining vouchers, etc.

Of the 928 utilities under the jurisdiction of the commission on Dec. 31, 1915, there may be excluded, as far as supervision over capitalization is concerned, more than 200 municipalities, unincorporated persons, etc., with the capitalization of which the commission has little or nothing to do. This leaves about 700 corporations which may reasonably be expected to require sooner or later an examination of their books in connection with security applications. Of these companies, there are 137 whose accounts had been examined by this division up to Jan. 1, 1916. Each company had its entire capitalization reviewed by the commission, and in connection with subsequent applications for authority to issue securities it will be necessary only to bring these examinations up to date.

TARIFF DIVISION

The work of the tariff division is mainly to prepare, for the approval of the commission, rules governing the form of tariff schedules and the procedure for filing the same, as well as to keep all schedules filed. This division now also handles traffic inspection at Buffalo with reference to freight congestion. The employees consist of the following: Chief of division ($4,000), traffic inspector ($2,400), chief clerk ($2,000), senior tariff clerk ($1,800), stenographer-and-tariff clerk ($1,500), tariff clerk ($1,200), bookkeeper ($1,200), stenographer ($1,200) and clerk ($1,080). The chief of the division handles directly the correspondence relating to administrative work, inquiries and informal complaints, and issues under the direction of the commission, orders permitting tariff changes on short notice, suspension of tariffs, etc. He also acts in an advisory capacity to the commission and represents it in tariff conferences. The chief clerk attends to the classification and distribution of mail, the preparation of memoranda on requests for information, and the supervision of the filing of rate schedules. In the absence of the chief he is in charge of the division. Other important organization details are included below in describing the progress of the work, the minor clerks being most concerned with the filing and the indexing.

During 1915 the schedules of rates filed for the various utilities numbered 18,272, of which 112 were returned as unlawful. There were also 579 authorizations of various kinds relating to rate and fare schedules and 123 contracts of gas companies and electrical companies, making the total filing for the year 18,862 and the total up to Jan. 1, 1916, 180,959. In the electric railway group the new tariffs filed were ninety-six for freight and 249 for passengers, the latter number including 192 short-term excursion tariffs. In addition, there were fifty-five supplements to freight tariffs and fifty-one supplements to passenger tariffs filed. Freight tariffs numbering 100 and passenger tariffs numbering 239 were cancelled.

A considerable amount of work is involved in the handling of all these rate schedules. They are received by the stenographer-and-tariff clerk, who reviews them to see that they are accompanied by a proper letter of transmittal, and that postage is inclosed if a receipt is desired. They are handed to a clerk, who stamps the date on them and enters them in the receipt book. A specimen page of this is shown in the illustration on page 199. The schedules are then sent to the chief clerk, who examines them to see whether proper notice is given as to the effective date and whether they generally comply with the commission's rules as to arrangement. They are next returned to the clerk to be sorted according to the various corporations, the gas, electric, telephone and telegraph schedules being given to the stenographer-and-tariff clerk and the common carrier schedules to the senior tariff clerk. If the new schedule is an amendment to or a superseding issue of the schedule on file, a comparison is made to ascertain what changes have taken place. As the schedules pass through the described route, a memorandum is made if any defect is discovered, and the defective schedules are sent to the chief of the division to be taken up with the corporations for correction.

Besides this routine work in handling rate schedules, the tariff division each week publishes a tariff bulletin, which is edited by the senior tariff clerk. A specimen copy of this is reproduced on page 199. These bulletins are the means whereby the public is kept informed as to changes in rates, etc. They are free to the public. Each weekly issue is ready for delivery, one to each applicant, at the office of the commission in Albany on Monday morning. The bulletins are regularly mailed free to commercial organizations, trade publications, and the daily and weekly press, and they will also be

MEMORANDUM OF ERRORS IN REPORT OF 19

Report No. Page

Examination made by Date

Line No.	Col. No.	Reported as	Think should be	Initials and date

COMMISSION REGULATION—FORM FOR CORRECTIONS USED IN DIVISION OF STATISTICS AND ACCOUNTS

mailed periodically to shippers or carriers upon written request if the necessary postage is supplied. In 1915 the tariff bulletins contained 8138 items, which involved the examination of 15,312 schedules.

The work of the tariff division, in order to be effective, requires an accurate system of filing. The present file case contains 222 drawers (10½ in. x 12½ in. x 24 in.), arranged in sections six drawers high. These sections show on their face the section numbers and the numbers of the filing corporations whose tariffs are contained therein. All tariffs are numbered consecutively by the commission and filed accordingly. Certain drawers contain tariffs in effect, while others contain those cancelled or superseded. The index case takes cards 3 in. x 5 in.

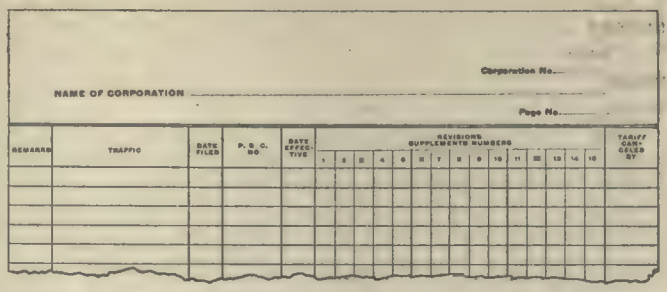
The intricate character of the indexing is well shown by the five-division system for steam railroad cards. First, there is a road card showing the name of the corporation; second, cards showing the form and the number of powers of attorney and concurrences giving the road authority to issue joint tariffs, and third, a division card headed "Local Rates." Back of this are cards showing for each tariff the file-case section, the road number, the point from and to which it applies, the history of rates by tariff numbers, and the dates effective. The fourth division of the scheme of index-

ing provides for a division card headed "Miscellaneous Schedules." Back of this are filed the cards indexing, in the same manner as class rate tariffs, all the miscellaneous schedules for back-haul charges, stock-feeding and watering charges, switching charges, etc. These miscellaneous schedule cards are filed alphabetically according to application behind sub-division letter cards. The fifth index division is for "Joint Rates." This group includes sub-division cards numbered to represent the road numbers of carriers, behind which are filed the index cards for joint rates. Moreover, all articles for which commodity rates are provided are indexed by this division as to article. Such indexing requires the making of from one to approximately 500 cards for a tariff.

Before leaving this division a mention should be made of its work in inspecting freight congestion. One employee, the traffic inspector, is located at Buffalo, where congestion is more prevalent and requires prompt investigation and provisions for relief. He looks after complaints and does such field work as is from time to time assigned to him. He also makes a number of investigations of the movements of less-than-carload shipments of freight between points on trunk lines. These inspections operate to keep the carriers' service uniform and to obviate complaints against delays which occur when carriers do not maintain their train schedules.

CENTRAL CLERICAL OFFICE

The work in the central clerical office is so diversified that it can probably be best explained by describing first the clerical employees, with their respective duties, and then important points in connection with the most


NAME OF CORPORATION

Corporation No.

Page No.

REMARKS	TRAFFIC	DATE FILED	P. S. C. NO.	DATE EFFECTIVE	REVISION SUPPLEMENTS NUMBERS	TARIFF CANCELED BY
					1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	

COMMISSION REGULATION—SPECIMEN PAGE FROM RECEIPT BOOK IN TARIFF DIVISION

involved part of the work, the filing and indexing system of the commission. The employees in this section may be classified in five groups: General, accounting, publishing, filing and stenographic.

1. *General Clerical Employees:*

The chief official in the general office is the executive clerk ($5,000), whose duties are many and varied. In general he writes memoranda to the commissioners as to the contents of petitions, complaints and answers, attends to the serving of orders by mail, sends out notices of hearings, draws some orders and conducts general correspondence. He now has three regularly assigned stenographers, and a large part of the time two or three additional stenographers work for him. The chief clerk of records ($2,500) follows up all orders to see that they have been complied with and reports thereon to the commission. He also has the custody of traffic contracts between carriers and is responsible for the indexing and filing of these. For certain annual reports

TARIFF BULLETIN No. 412

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
SECOND DISTRICT

Showing Changes in Transportation Rates
Week Ending July 13, 1916

NOTE.— The rate changes herein shown are made, voluntarily, by the carrier. Neither the filing of rates with the Commission, nor announcement thereof in this bulletin for the benefit of the public, implies any approval of such rates by the Commission. They are subject, as are all rates, to complaint, under the Public Service Commissions Law.

EXPLANATION OF ABBREVIATIONS AND REFERENCE MARKS: c. l., car load; c, cents; D., decrease; gal., gallon; cwt., hundredweight; I., increase; k. d., knocked down; l. c. l., less carload; min., minimum; n. o. s., not otherwise specified; No., number; O. C., Official Classification; o. r. b., owner's risk of breakage; lbs., pounds; P. S. C., Public Service Commission, Second District, State of New York; qt., quart; Sup., Supplement; wt., weight; * by special permission of the Commission. The terms net ton and gross ton are understood to mean 2000 pounds and 2240 pounds respectively.

EMBARGOES PLACED

New York Central (East).— On shipments of Hay consigned or to be reconsigned to all consignees at Westchester Avenue (Melrose Junction), N. Y.; effective July 13, 1916. Embargo 1203.

New York Central (East).— On shipments of Waste Paper or Paper Stock consigned or to be reconsigned to Smeallie & Voorhees,

barrel or barrel sack and [illegible] barrel. Change from rates per cwt.; reductions. Effective August 10, 1916. Sup. No. 4 to P. S. C. No. 595.

ELECTRIC RAILROADS.

FREIGHT.

GENERAL COMMODITY.

Albany Southern.— Various articles, including Baskets, Grate Bars, Board (fibre), Belting, Bobbins, Castings, Clay, Cloth, Lead, Machine Parts, Pumps, Radiators, Shoddy, Teasles, Twine, and Waste, l. c. l. and c. l., from Hudson to Stottville: Reductions too numerous to specify herein. Effective August 7, 1916. Sup. No. 3 to P. S. C. No. 123.

[illegible] No. 123.

SWITCHING CHARGES.

New York State Railways.— On Construction Material, c. l., from Utica Park to Stop No. 4, on Little Falls line, $15 per car. No switching rate heretofore in effect. Effective July 14, 1916*. P. S. C. No. 5.

STEAM RAILROADS.

PASSENGER.

ONE-WAY, ROUND-TRIP, AND COMMUTATION FARES.

Buffalo, Rochester & Pittsburgh.— Joint one-way per capita fares for parties of ten or more adults or their equivalent traveling together on one ticket to Plattsburgh, via Rochester,

COMMISSION REGULATION—SECTION OF WEEKLY BULLETIN ISSUED TO INFORM PUBLIC AS TO CHANGES IN RATES

of the commission he prepares statements covering the history and organization of the various corporations. The hearing and publicity clerk ($2,500) prepares statements in regard to commission decisions for the daily, weekly and technical press.

The general clerical section of this division has assigned to it four male stenographers, one of whom is temporarily assigned to the division of statistics and accounts. The remaining three perform certain work in the clerical department in addition to their stenographic routine. One stenographer ($2,000) supervises the opening and stamping of all incoming mail and assists in the sorting and distributing thereof, and he also reads all outgoing correspondence for typographical and grammatical errors and reports any necessary rewriting to the secretary. In a general way, he is responsible for the mailing work of the commission. Of the two other stenographers ($1,500), one receives the follow-up matter from the filing department each day and sees that it is sent through the secretary's office to the proper individuals, while the other distributes the hearings for the calendar and keeps a chronological record of them, as well as a register showing the status of all complaints before the commission. There are two clerks ($1,500), one of whom keeps a docket record of all formal cases. The other clerk is a general utility employee for the office, assisting and substituting for the docket clerk and the auditor, acting as librarian for the commission and assisting in the compilation of statistics for the annual report of the commission.

A messenger ($1,080) is in charge of the supply room and under the direction of the secretary purchases and distributes office and typewriter supplies. He has the custody of all annual reports and bound volumes and directs the mailing of these. A laborer ($2 a day) assists this employee in the packing of reports, etc. Two junior clerks ($720), one junior clerk ($600) and two pages ($480) open, stamp and deliver the incoming mail and also seal and stamp all outgoing matter. These employees are general office and errand boys for the commission. There is also one telephone operator ($900), and a janitorial force consisting of two laborers ($900), one laborer ($720) and one cleaner ($1.25 per day).

The Public Service Commission law requires that the office shall be kept open from 8 a. m. until 11 p. m. On account of this provision there is a night clerk ($1,500), who reports at 5.20 p. m. and remains until 11 p. m. on every working day. He answers the telephone, opens messages and if necessary reports these to the secretary. The duties of an attendant ($600) are the same as those of the preceding employee, except that he works from noon until 11 p. m. on Saturdays and from 8 a. m. until 11 p. m. on Sundays and holidays.

The commission also maintains a section of its general office in Buffalo, which is in charge of an assistant to the secretary ($1,500). He keeps a record of local hearings and their disposition, and receives complaints, etc., for forwarding to the Albany office. This employee is the only one in the Buffalo office, except when other employees of the commission make use of it for convenience.

2. *Accounting Department:*

The employees in the accounting section of the general office consist of the auditor and his clerk. The former keeps all the financial records of the commission, makes up the payroll and relieves the secretary by handling all civil service matters concerning the commission. He is assisted when necessary by his clerk, who is that general utility clerk mentioned under the preceding heading. This clerk is qualified to act in the auditor's absence.

3. *Department of Publication:*

It is the function of this department to edit all reports, bulletins, orders, forms, circulars and other matter that are printed under the authority of the commis-

NUMBER	CLASS NO.	DATE RECEIVED	DATE CLOSED	COMPLAINANT	RESPONDENT	SUBJECT
A 3526	72.62	27 S 16		Schwinger & Gressmald,49 W. 38th St.New York City.	N.Y. Tel. Co.	Refusal to give coin box service.
A 3527	63.62	28 S 16		Montclair Improvement Assn.,120 S. Salina St., Syracuse, N.Y.	Syracuse Ltg. Co.	Refusal to make extension on Seeley Road, Syracuse.
A 3528	12.16	"		Will, V. P. M.D., Batavia	N.Y.C.	Blocking crossings at Harvester Ave., Swan St. and Jackson/ St. Batavia,
A 3529	44.2 44.24	"		Brisbane, James. 488 East 68th St., Brooklyn, N.Y.	National Express Co.	Delay and damage to shipment of plums from Arena to Brooklyn.
A 3530	14.2	"		Akron. Residents by Bill, S. E. et al., Buffalo,N.Y.	N.Y.C.	Service between Buffalo and Rochester.
A 3531						
A 3549						
A 3550						

COMMISSION REGULATION—SPECIMEN PAGE FROM ACCESSION BOOK USED IN FILING DEPARTMENT FOR RECORDING CORRESPONDENCE COMPLAINTS

sion. The superintendent ($2,400) is directly responsible for such work. He arranges, revises and edits the material, makes all proper and necessary arrangements with the State printer; settles the details for the printer, such as the size of paper, quality, etc.; makes requisitions for printing, with estimates of approximate cost, and checks and approves the bills. He is assisted by a proofreader ($1,080) and a clerk ($900).

4. *Filing Department:*

The filing department is charged with the custody and recording of all papers, reports and correspondence handled in the commission with the exception of special files maintained in some of the divisions on account of expediency. The department contains two filing clerks ($1,500), one filing clerk ($1,200) and one clerk ($1,200). The first two change work each week so that each employee knows the entire scope of the work and is able to take up any part of it in an emergency. One week's work includes classifying the secretary's first morning mail and directing the indexing of it by the clerk; making up the subject matter of most of the correspondence complaints, which are indexed by the clerk; answering requests and getting out from the files old papers asked for; revising the indexing and classification of all formal petitions and complaints, and

with the assistance of the clerk filing papers belonging to these. The next week the work covers the collection and dispatch of papers for out-of-town hearings and the supervision of the follow-up system.

The ($1,200) filing clerk has general charge of classifying and indexing the first morning mail other than the secretary's, and all second morning and afternoon mails. She also reads over and classifies all interdepartmental letters and letters of commissioners received without numbers referring to the commission's files. She enters correspondence complaints in an "accession book" and makes filing folders therefor. Each morning she looks up all follow-up material in formal cases, informal complaints and general correspondence. She closes informal complaints by marking folders, index cards and book record with the date of closing and makes a list for the secretary, and she also closes formal cases by marking "closed" on the envelope of the case and the date of closing on the index card.

5. *General Stenographic Force:*

Besides the stenographers previously mentioned in connection with the various divisions and officials, there is in the general office a stenographic force consisting of a chief stenographer ($1,800), one stenographer ($1,500), four stenographers ($1,200), two stenographers ($1,080), one stenographer ($600), and two stenographers ($480). These employees attend to the writing of reports, memoranda, notices and orders of the commission and the making of copies thereof, this work being done chiefly through the executive clerk. They also do the stenographic work for the auditor and the steam railroad and electric railway inspectors, and they assist in the various other divisions when necessary. Some of them do copying work from the commission's files, records and decisions, as requested by attorneys and other interested parties, for which work the commission is reimbursed.

FILING AND INDEXING WORK

As before stated, the most involved part of the work arising in the clerical division occurs in connection with the routine tasks of the filing department, which has to keep in orderly fashion and available shape the multitude of papers and records that come to the commission. The most interesting points have to do with the filing system used, the indexing methods, the charging and follow-up systems and the handling of mail.

1. *Filing System:*

The problem of devising an adequate filing system for the commission was a perplexing one. Finally, however, a highly useful and essentially economical decimal system was worked out, and this is the one now in use. The principle of the system is the assigning to each of the ten digits from 0 to 9 a class heading and then subdividing for subjects as often as necessary. Thus the main headings cover the classes of public utilities under the supervision of the commission, as follows: 0, general; 1, railroads; 2, street railways; 3, ————; 4, express companies; 5, ————; 6, light, heat and power companies; 7, telegraphs and telephones; 8, terminals and warehouses, and 9, ————. Where a dash is shown the number is left open for future use.

These are further divided according to the subjects arising out of the practical working of the commission law. As far as possible, the same figures have been used to show analogous sub-divisions of main heads throughout, as such an arrangement makes for greater mnemonic value. For instance, 11. stands for stocks, bonds, etc., of steam railroads, 21. of street railways, 41. of express companies, and so on throughout the classification. Subdivisions after the decimal point in each group are made as far as needed. For reference purposes the filing department has an alphabetical index to the classification for every possible heading and all synonyms.

The cabinets in the filing department are of steel construction, and are divided into drawers wide and deep enough to hold legal size documents. Under the class number in the file the material is arranged alphabetically, generally under the name of the company and occasionally under the name of the correspondent. In front of each subject there is a large guide card bearing the number and name of the subject, plainly printed on a celluloid tab. On the face of the main guide there is an outline of the divisions and sub-divisions for the class number and the subjects they denote. Simple correspondence is filed just as it comes in. Informal correspondence complaints are placed in heavy manila binders, ruled on the outside to show the file and complaint numbers, name of complainant, nature of complaint and closing date.

Formal complaints, those which cannot be adjusted by correspondence and upon which it is necessary to hold hearings, are treated in the same manner as applications from companies for permission to exercise franchises, issue securities, etc. The documents and correspondence in such formal cases are placed flat in large linen envelopes. The various kinds of papers for each case, such as correspondence, briefs, orders and permissions of service and testimony, are fastened separately in binders of distinctive color before being placed in the large case envelope. This obviates the necessity of going through the entire envelope in order to locate any particular kind of document. Formal and informal cases are transferred from the files as they are closed, but simple correspondence is transferred annually.

2. *Methods of Indexing:*

The method of indexing simple correspondence consists simply of writing a card (3 in. x 5 in.) under the name of the correspondent with a file number at the left. Cross-reference cards are made for the names of additional correspondents. A letter on a new subject would mean the addition of a new class number on the correspondent's card. In case the letter refers to a particular company, the main entry would be made in the name of the company and a cross-reference card under the name of the writer. Cross-reference cards are also used for any company officials who sign letters. If the name of a place is mentioned, a blue cross-reference card is prepared.

The indexing of informal correspondence complaints is a little more elaborate than that for simple correspondence, but it is along the same lines. The name of the complainant is indexed on a white card, that of the respondent corporation on a salmon card, and that of the place, if any, on a blue card. Each card is marked "CC" (*i.e.*, correspondence complaint) in the upper right-hand corner, and on it is placed a brief statement as to the nature of the complaint. A serial number is assigned to each complaint in the order of receipt. This number corresponds to a record kept in an "accession book," a specimen page of which is reproduced in the illustration on page 200. In this a single line is used for each complaint, and twenty-five can be entered on one page. The chief value of this book is its use for statistical purposes, as it is a very simple matter to count the number of complaints received under each class during a year. It also helps the filing clerk to locate complaints when they are called for by serial number.

Formal matters are indexed on the same colored

cards as informal correspondence complaints, green ones in addition being used for applications for new securities, etc. A case number is placed on each index card, this being taken from the docket, in which a whole page is reserved for each case. All papers or letters in relation to formal cases are entered in this book before being filed, as well as the dates of hearings, closing resolutions and orders.

3. *Charging System:*

A simple charge system for letters and other material removed from the files is kept by means of small blank manila slips (about 2 in. x 3 in.). These slips contain the file number, the date of the letter or document, the name of the borrower and the date when taken. They are arranged in a special drawer in exactly the same order as the material in the files. When the papers are returned, the slips are destroyed. Should any member of the staff transfer any letters or documents charged to him, a transfer slip having a notation to that effect is sent to the filing department. From this slip a new charge is made and the old one destroyed.

4. *The Follow-up:*

An important function of the filing department is the following up of all matters until they are brought to a conclusion. The system used is the "Memindex." A notation is usually made on the face of correspondence returned to the files as to the date when the person conducting it wishes to have it again. In the absence of such notation, the clerk who discharges it uses her own judgment as to the date when it should be brought up for attention. Each morning one of the filing clerks takes from the files all papers which need attention that day, and these are sent to the secretary's office for distribution. Follow-up cards are also kept for various members of the staff, these containing lists of the matters which have been delegated to them for special investigation, etc.

5. *Handling of Mail:*

A point worth special attention is the procedure gone through in handling the incoming mail. All such mail goes first to the filing department, where it is classified, indexed and charged. Any previous correspondence is taken from the files and sent out with the incoming letters. Thus a record is obtained for each piece of mail before it comes to the attention of the addressee, and he automatically receives any related correspondence.

COST OF REGULATION

What it has cost the taxpayers in New York State to build up the regulatory machinery that has been described may be partly judged from the following table showing the expenses of the commission for the periods designated:

First fifteen months, July 1, 1907, to Sept. 30, 1908	$307,734
Fiscal year from Oct. 1, 1908, to Sept. 30, 1909	276,575
Fiscal year from Oct. 1, 1909, to Sept. 30, 1910	295,443
Fiscal year from Oct. 1, 1910, to Sept. 30, 1911	342,739
Fiscal year from Oct. 1, 1911, to Sept. 30, 1912	372,323
Fiscal year from Oct. 1, 1912, to Sept. 30, 1913	373,068
Fiscal year from Oct. 1, 1913, to Sept. 30, 1914	405 955
Fiscal year from Oct. 1, 1914, to Sept. 30, 1915	438,056
	$2,818,893

The appropriations for the last fiscal year, from Oct. 1, 1915, to Sept. 1, 1916, amounted to $394,296. The foregoing figures, however, do not include $43,414 expended from a special fund of $100,000 appropriated to investigate telephone rates in New York City. Probably the real cost of the commission for the nine years of its existence will be not far from three and a quarter million dollars.

New Clubhouse for Employees

Chicago Surface Lines Opens New Clubhouse for Its Employees, Made Necessary by the Growth of the Club Formed Two Years Ago

ABOUT 600 employees including the various officials and department heads were present at the opening of the new Chicago Surface Lines clubhouse at 1126 North Dearborn Street on Jan. 20. The club quarters are the natural outgrowth of the activities of the Surface Lines Club which had its beginning just two years ago when a small group got together in a bowling club. The idea grew from the good spirit of this small organization and the officers fostered the plan of promoting the feeling of fellowship and common interest among the employees until the club came to include some 700 members from the administrative offices with a women's auxiliary of eighty members.

From the enthusiasm which prevailed at the first annual banquet at the Midday Club, at the dances and other social events, it became evident to the officers that the club should have a home. The property on Dearborn Street offered the possibility. This is a three-story building on the north side, five minutes from the loop, which was originally built as a club house for the old Lincoln Cycling Club.

When the Union Traction Company built its cable-power house just back of this on Clark Street, it was forced to purchase this property on account of the vibration caused by the heavy engines. The place has since been leased to different organizations, with the last lease expiring on Aug. 1, 1916. Shortly afterward the officials decided to make this the social center of the company, and accordingly began making the building ready. The interior was rebuilt and redecorated completely, except two rooms on the main floor which are now used for the library and the chess and checker room, in which the old genuine black walnut woodwork was refinished and retained. The rooms were pleasantly furnished and the club equipped with two bowling alleys, an indoor golf course, swimming tank, gymnasium, etc. The library and lounging room on the first floor were furnished in a particularly attractive manner. There is also an auditorium which will seat 600 people comfortably, and a stage large enough to serve the company's entire orchestra. This room will also be used for dancing.

At the opening gathering, President L. A. Busby, H. A. Blair, J. E. Wilkie and A. J. Klatte, president of the club, gave short addresses, and the company orchestra furnished music. Later the ladies' auxiliary served light lunch and dancing followed.

It is the plan of the club to reserve the bowling alleys and swimming pool for the use of the ladies one evening a week. The present activities of the club will probably be extended later on to include certain educational features, and it may eventually become a section of the American Electric Railway Association.

In keeping with an annual custom the Illinois Traction System, Peoria, Ill., has awarded prizes to the substation attendants at stations where the appearance of stations and station grounds was the best during the past year. For stations with an agency first prize was awarded to Pithian, second prize to Harristown. For stations without an agency first prize was awarded the attendants of the substation at Anderson, second prize to Virden. In the bulletin announcing the prize winners Signal Engineer John Leisenring comments on the improvement in condition of many other stations. The competition for the 1917 prizes promises to be decidedly keen.

Developing a Publicity Plan

Immature Publicity Ideas of Officials Handicap Publicity Men—Latter Must Have Real Chance to Show Way to Publicity—Means of Promoting Loyalty of Employees and Minimizing Public Antagonism

By W. DWIGHT BURROUGHS
Publicity Manager, United Railways & Electric Company, Baltimore, Md.

AN electric railway contemplating the employment of a publicity manager should first determine that it wants publicity. The man approached to undertake such work should assure himself that the organization wants publicity. Wanting a publicity man and wanting publicity are not so closely related as the uninitiated may suppose. The reason for this is that the average railway official is so thoroughly wrapped up in the minutiæ of his business that he has no publicity ideas at all, or those that he has are of such a primitive character that they are worse than useless—they are dangerous.

It is all very well when the employing organization understands this. It too frequently happens, however, that such is not the case, and the publicity man's first task is to disillusionize his employers. Sometimes this is his most difficult and discouraging task. Publicity men who have met such conditions tell me the more primitive the publicity ideas held by company officials, the more insistent these men are that such ideas are the actual goal posts of successful publicity. This attitude, if persisted in, stultifies the most efficient efforts that might be employed by the publicity man for the good of the organization. It blocks the way to the accomplishment of anything that proper publicity would bring, and when such officials finally come to a realization of the stationary position they are occupying, they simultaneously realize that they did not want publicity in the first place.

Do Not Tie Your Publicity Man Down

Hence, if you imagine you want a publicity man, satisfy yourself that you really want publicity. Then get a good man—one who will have confidence in you, as well as one in whom you will have confidence. Give him a chance to learn something about the business, and then let him show the way to publicity.

Do not tell him all you know and require him to follow your ideas without deviation. Do not give him a guide book to publicity and tell him to follow exactly all the rules laid down therein. Do not hand him a copy of the address of some one at the Atlantic City convention and tell him to have no other rule than those laid down in that eloquent paper. Do not show him a magazine article by a publicity man—Burroughs or anybody else—and direct him not to depart from the suggestions made in it.

Your publicity man can absorb a great deal of good from all these various agencies, but he should not be tied down to any rules that have not been predicated upon the conditions he finds in your organization and in your community. Tell him all you know of publicity, give him the guide book if you want to, let him read all the convention addresses and the magazine articles on publicity, and then tell him to select from each of these sources the best ideas to meet the particular situation which he has to meet.

Persons who make a close study of railway operations must be impressed with the care exercised—frequently under the most discouraging and unfavorable conditions—to cater to public comfort, convenience and safety, and to comply with public demands. I believe that the railways desire to give the people what they need; that they are anxious to render the best service possible, and that they accept the legal maxim: "When you devote your property to a use in which the public has an interest, you grant to the public an interest in that use and must submit to being controlled by the public for the common good to the extent that such interest is created." And, generally speaking, I believe that railways dissent from suggestions for their control only when they believe the suggestions do not represent the public will, and when they are not satisfied that the control sought is for the "common good."

It is so very easy to understand that the best interests of such a public service corporation as an electric railway is to do the people's will, that there can be but one answer to the question: why does any part of the public assume, as it undeniably does, that the company is antagonistic to the people, arbitrarily set against them, contrary-minded and obdurate, pompously running roughshod over the community without leave or license, save when it is summarily seized by the neck and shaken to its senses? And that answer is, the people do not know. They have not been taught to think kindly of corporations generally, and they have had many opportunities to be misinformed concerning the railway in particular.

There is not a man in any railway-blessed city in the land who, if he took stock of his store of information, would not find that he knew fifty good things about the electric railway, fifty ways in which it was of indispensable worth to him. Yet, because he knows one thing that he does not like (which fact does not signify that it is wrong), he is prone to forget the fifty benefits he enjoys and rise in indignant protest, denunciation, abuse and insult. No public service corporation will ever be free from unjust attacks. There is no earthly possibility of the extinction of the fanatics, grouches and unreasoning people who constitute an ever-present thorn in the side of everything good. But the vast majority of the people are reasonable, if one can reach them and direct their reasoning into correctly charted channels, and this directing must be done by practice and preaching.

Fostering the Spirit of Service

One of the best forms of preaching for an electric railway is that done by individual employees. For instance, the newspapers may devote columns of space to articles saying that street railway treats its men with fairness, but the man who reads these columns will not be half so much impressed as he will be by the plain spoken answer of an employee in such a conversation as follows: "Where are you working?" "On the Sixth Avenue line." "How do they treat you?" "Fine!" Here is the ideal situation. The company has won the loyalty and confidence of the employee, and he has become a preacher to the people. Railways need thousands of such preachers, and they will be far more eloquent than a whole lot of words in the newspapers.

The problem of every publicity man is to promote and foster a spirit of service in employer and employees, and to help this spirit of service to become generally recognized in the community as synonymous with safe service, courteous service and efficient service? To the extent that a corporation is able to instill in the heart of each individual and into the daily practice of every employee this spirit of care, courtesy, capability and co-operation, to that extent will it progress toward the solution of the problems that it is called upon to face. If a railway is diligent, constant and conscientious in its devotion to service, it is going to infuse some of this self-same spirit into the public mind and action, win its confidence and strengthen its moral support.

One may appear rather optimistic and enthusiastic in thus expecting a development of greater devotion to the organization among its employees and a cultivation of a clearer understanding of the organization by the public, but optimism and enthusiasm, faith and energy are essential to the accomplishment of the things in mind, if one intends to go after them in dead earnest.

Success Requires Time

In this undertaking it is impossible to achieve a considerable measure of success in a day, a week or a month. One can make headway with an individual in a day, an hour or probably an instant. A courteous word, a considerate act, something which is done right and which the layman can see might have been done wrong with the exercise of less care—any or all of these will help to win a friend. But it will not suffice for Citizen Smith to have a good opinion of the gentlemanly qualities of Jones, the conductor; or of the proficiency of Brown, the motorman; or the accuracy of Black, the clerk, or of the executive ability of White, the official. He must come to know that Jones, Brown, Black and White are not exceptions but are types of the men throughout an organization which is doing with all its might everything it can to render the public a safe service, a courteous service and an efficient service.

In an effort to analyze ways and means of encouraging employees and promoting loyalty to a company and of minimizing public antagonism and cultivating public support, I have arranged a classification of ideas which may be considered severally or jointly. Some of these are now in practice in many companies. Others are probably impracticable in some cities. Some that appear at first blush to be impracticable may prove upon consideration to be perfectly feasible.

For Cultivating Public Support

1. News articles for the newspapers concerning the activities of the company:
   - a—Construction work (prospective, under way and completed).
   - b—New, remodeled and improved equipment.
   - c—Routes and re-routing.
   - d—Schedule changes.
   - e—Special provision for meeting specific conditions.
   - f—Such action of the board of directors or officials as may be interesting to the public, etc.

2. News articles for the papers concerning resorts reached by the company:
   - a—Current and coming attractions.
   - b—Public activities at these resorts, with daily publication of organizations attending, games scheduled, etc.

3. Feature articles for the newspapers concerning interesting phases of the railway business.

4. Transfers; use of the reverse side for safety advice.

5. Folders.

6. Newspaper advertising.

7. Leaflet for distribution in the cars weekly:

This should be prepared with the idea of inspiring it with an educational value through the presentation in concise form of plain, striking facts and figures with which the public is not familiar, but which it should know if it is to be led to a proper conception of the railway's place in the life of the community.

8. Talks on interesting railway topics to community gatherings and civic, social, church and other organizations.

9. Safety first exhibition, or a general railway educational exhibition.

For Encouraging Employees:

1. Sports:
   - a—Baseball.
   - b—Bowling.
   - c—Billiards.
   - d—Outings.
   - e—Other pastimes.

2. Entertainment:
   - a—Reading rooms.
   - b—Periodic meetings at which there may be talks on railway matters by heads of departments, etc., and on general current interest topics by outsiders.
   - c—Other entertainment.

3. Publicity:
   - a—Newspaper reports of results of contests, etc.
   - b—Newspaper reports of anniversaries of service, etc.
   - c—Personal items to be placed in the newspapers for the men.
   - d—A magazine:

This should be published monthly. Its contents should be informative and encouraging; not too technical, but instructive and helpful—including good, plainly written contributions from heads of departments, etc., on various phases and features of the street railway business, the operation of the road, daily transportation problems and how they are solved, methods of management, the system in different departments, etc. With all its seriousness it should avoid heaviness and sombreness, though it should impress its readers with the dignity and importance of the respective posts which they fill and of the duties they are called upon to discharge. In short, it should be worth while to every member of the organization. Its contents should not go over the heads of any of its readers, and it should be thought too much of by them to be tossed under foot. It should have a regular column or page for suggestions and these should be solicited from all employees. There should also be a "question box," the answers being prepared by the heads of those divisions within whose province the questions severally fall.

4. Commendation.

5. Compensation—fair pay for fair work.

6. Rewards, a pension system and a life insurance plan.

7. General welfare work, looking out for the sick, etc.

In a recent decision of the Interstate Commerce Commission the New York Central Lines are ordered to enter into an arrangement with the Illinois Traction System for joint through rates from Fetzer, Ill., to points on the New York Central lines in specified territory. The decision was rendered in answer to a petition from shippers at Fetzer, a small station on the lines of the Illinois Traction System near Springfield.

Several Recent Publicity Posters

Getting Down to Rock Bottom

We must have the good will of the people we serve, to make this a successful public service corporation, from every standpoint.

We must give good service to merit your good will.

President,
International Railway Co.

We Care What You Think

We care a great deal what the people of Buffalo say and think about this Company.

Our earnest effort is constantly to improve our service.

President,
International Railway Co.

WE COURT PUBLICITY

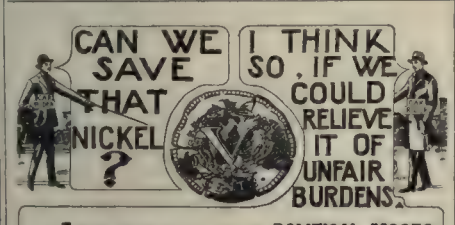
The more the people tell us about this Company the better we like it.

We like people to talk about us.

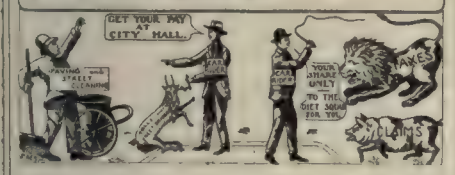
If it is good news, it makes friends for us.

If it is constructive criticism, it helps us correct conditions which should not exist.

President,
International Railway Company



Every year or so, some POLITICAL MOSES bobs up "TO SAVE US FROM THE TRACTION COMPANY" by imposing on the nickel some new burden which, of necessity, REDUCES CAR SERVICE. Should we not choke the goat, put the lion and pig in the diet squad, let City Hall pay the whitewing, and demand that THE NICKEL BE USED EFFICIENTLY FOR RUNNING STREET CARS FOR US?



THE three posters at the top of this page were issued by the International Railway, Buffalo, within the past two weeks as part of its present campaign to improve public relations. The two posters in the middle of this page have just been published by the Pittsburgh Railways. They form parts of the series begun by the company on "How long will the nickel stand the strain?" mentioned on page 1338 of the issue of this paper for Dec. 30, 1916. The reproduction at the bottom of the page shows four of eight safety-first sketches, published in a recent Sunday comic supplement of the *Kansas City Post* and forming part of the safety campaign of the Kansas City Railways. As a direct way of reaching the children this method of advertising seems effective.

SOME THINGS THE COMPANY HAS DONE TO SAVE THE NICKEL

ORIGINATED THE LOW-FLOOR CAR, WHICH MARKS AN EPOCH IN SURFACE TRANSPORTATION. THIS CAR IS BEING COPIED IN MANY AMERICAN CITIES.

IT SAVES

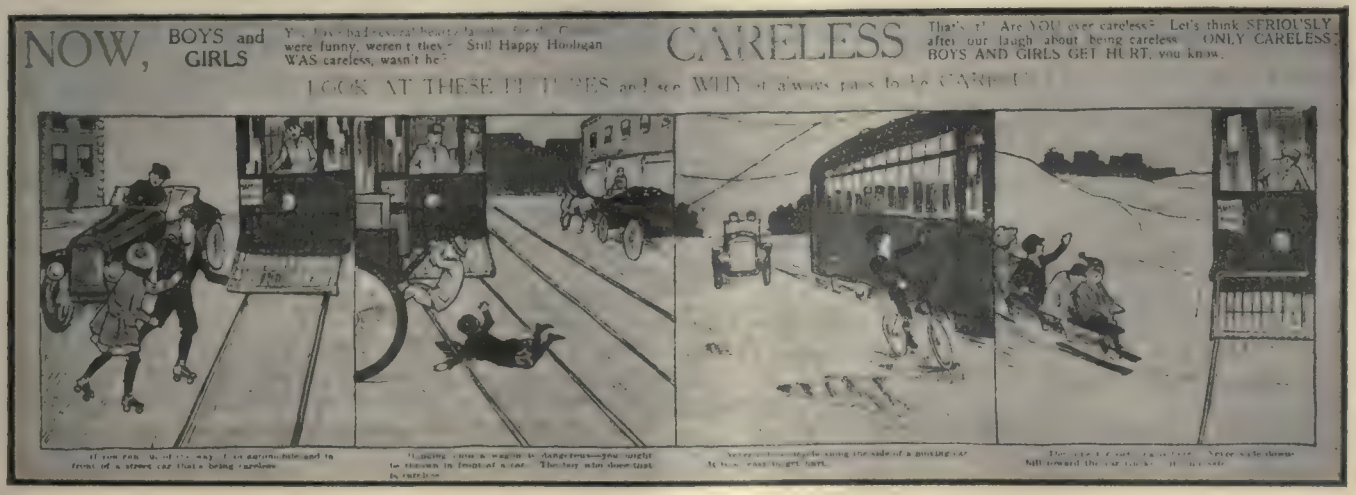
- 1/4 in weight.
- 1/3 in electric power.
- 1/2 in time to enter or leave.
- Wear and tear on track.
- Number of steps into car.
- In number of passengers carried per car.
- Accidents due to strength and design of car.

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Development of Traffic

Symposium of Articles Describing the Methods Followed by Four Prominent Interurban Railway Companies—The Haulage of Freight Is Considered a Most Desirable Form of Revenue

THE ELECTRIC RAILWAY JOURNAL has obtained contributions on the subject of freight traffic from the offices in charge of this class of business on four important interurban railways. Many electric railway companies carry on a freight traffic on a small scale. A few of them do a considerable business in this line. The greater number have as yet done nothing. The writers in this issue point out that freight haulage offers an opportunity for much greater gross revenue with comparatively little investment. Their articles should be helpful at this time when automobiles are affecting to a considerable extent the passenger traffic on many interurban lines.

Advantages of Interline Business

Through Routing of Passengers and Baggage Desirable—Freight Offers a Good Field for Increased Revenue

BY F. D. NORVIEL
General Passenger and Freight Agent, Union Traction Company of Indiana

The development of traffic can be separated into two divisions, passenger traffic and freight traffic, and the latter into three subdivisions: package freight (l.c.l.), carload commodities and an expedited freight traffic peculiar to the Central West—freight carried on passenger cars and sometimes called "traction express." A volume could be written on any one of the above subjects, so that each must of necessity be treated in a brief manner.

First, let us have a square look at our passenger traffic as a source of revenue, and analyze if possible its future.

The electric railways were built as extended street car lines—urban lines—which gradually grew to be the interurban lines as we know them to-day. At first, passenger traffic was the only source of revenue considered and this, only as it might be expected from the immediately local territory. Freight and through travel received no thought in these first estimates, although as early as 1901 the "velvet" which might be secured from handling package freight was being occasionally mentioned, timidly we must admit. But what of to-day?

I think it is safe to say that practically every electric line is taking in a revenue from passenger traffic equal to, or in excess of, its most optimistic estimates, but this business is not all derived from the contiguous territory. Traction lines are fast losing to the automobile the local traffic that was once their life blood, but this business is being replaced by the longer haul and more valued interline traffic. If the revenues on electric lines have met their first estimates, why are they so hard up? Because the operating and maintenance costs were largely underestimated; hence the need for more revenue.

Now, what additional traffic can be secured from the passenger side of the transportation business? For let it be conceded that this represents as yet, on an average line, 75 per cent to 90 per cent of the gross revenue.

First, to hold what local travel you have, and possibly coax some more back to you, maintain clean cars and good schedules, keep the trains on time and tell the people about it. To do this, use the newspapers; put out neat and attractive advertising cards and plenty of time-table folders. But at home, good service will advertise a road better than anything else.

Second, if you have parks on your line, go after this business vigorously in the summer time; put on something special and run Sunday or week-end excursions. It is better to fill all the seats at half-price than to have two-thirds of the seats empty. It gets the people in the habit of riding with you. But be sure to give the people all or a little more than you advertise. Do not attempt to fool them.

Third, affiliate with every possible connection, steam or electric. You may not get much from any one of them, but every little helps—"many a mickle make a muckle." Tell the people in your advertising about this and take good care of them when they come to you.

Fourth, where possible put on long runs for trains. Go right in and compete with the trunk lines for this traffic, and do the best you can on schedules and cars, but do not forget that cars have to be kept clean and that they will not stay clean long in service unless looked after. Ticket your passengers through, check their baggage through and arrange your train collections so as not to bother your passengers any more than absolutely necessary. Above all, do not forget to tell the people what you are doing.

Fifth, make arrangements with some good steam line connections and acts as "collector of traffic" in your territory for them, for operating excursions, tourists' arrangements and like traffic to places of interest that you cannot reach by your own rails. Ticket and check baggage through, broaden your working territory to the whole country and then tell the people. This is the way to keep your revenues up. In the railroad business the injunction applies that "to those that have, more shall be given."

FREIGHT TRAFFIC

When we speak of freight traffic we mean freight just as it is recognized on steam lines, car-load and less-than-car-load. Traction lines, almost without exception, are poorly prepared to handle this traffic. Nevertheless I venture to say without fear of contradiction that there is no electric line which does handle freight but has more traffic offered to it than it can possibly take care of. Thus we know that this is a good field for increased revenues. The necessity to advertise does not now exist, but when needed I would surely do it, and I think the very best possible way to advertise this service is to visit the firm, see the "boss" first, and the shipping clerk next, leaving a shipper's guide which shows the points to which you can handle freight and the delivery time, having such guides carefully prepared and printed for each large shipping center. Then visit the retailer in each outlying city or town and induce him to order goods via your line. Keep hammering on your freight service in all general advertising put out, as this does not cost much and is the means of telling the story to the people. These

suggestions apply equally to freight both in carloads and less-than-carload lots.

As to special business, the hauling of milk and other dairy products, country produce, poultry and eggs, fresh meats, fruits and like commodities, is yours if you will only take care of it. The securing of pasteurizing stations in dairy centers and the location of poultry, egg and game depots at various points for shipping to industrial centers are easy matters if you can show the people the advantage to be derived from the use of the traction line. Hauling truck farm produce from loading stations at cross-roads, with the privilege of market selling from the car in some established market location on stated days, thus delivering the goods direct from the producer to the consumer, means much to the people and will be appreciated by them, but the commission men will not love you. The above are all matters of detail only and comprise traffic for which the electric lines have a peculiarly clear field of action.

Last but not least comes freight carried on passenger cars. This traffic has become in the Central States a valuable and real asset, a service that the people would not do without were we to try to discontinue it, for it supplies a real want. There is only one "class rate" recognized in our tariffs covering this service, the rates being based on about 50 per cent to 70 per cent of rates between like points via the old line express company, although the minimums per shipment are the same. This traffic is as yet only in its experimental stage, and there is no telling where it may eventually reach. All that is necessary is to work out all details, give efficient service, tell the people this, and gather in the shekels.

Performance of a Michigan Road

During 1916 This Company Operated as High as Eighty Freight Trains a Day—The Service Was Superior to That of the Steam Railroads

BY JAMES H. POUND
General Freight and Passenger Agent, Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.

The Benton Harbor-St. Joe Railway & Light Company is situated differently, perhaps, than any other electric railway in the country in regard to the handling of freight. It is divided into two divisions, one 14 miles long, known as the Watervliet division, the other 25 miles long and known as the Dowagiac division, Benton Harbor being the terminus of both lines. The Dowagiac division passes through Eau Claire, population 500, on the Big Four Railway and terminates at Dowagiac, population 6000, on the Michigan Central. The Watervliet division passes through Millburg, a small unincorporated hamlet, Coloma, population 800, and Watervliet, population 1000, on the Pere Marquette. So it will be noted that we have no outlet for carload shipments except to the farmer direct. This business is encouraged by having a siding at every cross-road, usually about a mile apart. We have switching arrangements with the Pere Marquette Railway at Coloma, so that we may handle steam-road cars on our Watervliet division.

In 1916 we handled about 400 refrigerator cars of fruit which were shipped to all parts of the country. Ordinarily about 150 cars of manure are handled each season and approximately 750 cars of miscellaneous freight, such as coal, lumber, cement, etc., making a total of about 1300 cars which are distributed or loaded exclusively by the farmer. The use of manure for fertilization purposes is quite essential in this country, and this office has made arrangements with one of the largest distributing companies to handle its business, and most of this produce is ordered through our office and delivered to the farmer at no extra expense to him. In other words, we do all the work.

We operate at least two freight trains every day, and during 1916 operated as high as eighty trains in a day, each train composed of a motor with from one to six trailers. We have direct connection with the Chicago boats at Benton Harbor so that the farmer may leave his shipment on our docks as late as 6 p. m. and it is on the Chicago market at 4 o'clock the next morning. We pick up freight from the docks early in the morning and have it delivered to our farthest terminal by 8 a. m. This proves to be excellent service for the farmer. We also have through connection to practically all points in Indiana (traction all the way) nine months in the year, giving sixteen-hour delivery to Indianapolis and twenty-four-hour delivery to Ft. Wayne, Logansport, Lafayette, Shelbyville and Richmond, Ind. During the rest of the season the service requires about twelve hours' additional time.

In freight equipment we have five freight motors, twenty box and nine rack flats, all equipped up to M.C.B. standards. In addition to our carload business, which during September averaged thirty cars per day, we run practically the same number of cars to the boats loaded with fruit, which is exclusive of our package business.

We have encouraged the different business enterprises to ship our way, so that, for instance, we average five carloads of ice daily during the summer months. In winter, our flats are all busy carrying logs. Our rates to all points when there is steam road competition are based upon the steam-road rates and in some instances are higher. But superior service makes up the difference and gives us more than our percentage of the business.

In the handling of milk, express and mail, we have arranged so that all three of these commodities are carried on the same train. They are carried on passenger runs and are handled without additional expense to this company. The trains carry an express trailer, and the express matter is all handled by the express company. We charge 1½ cents per gallon for transporting milk, and return the empty cans free. These full cans are handled by our passenger crew in charge of the train.

We handle United States mail only as an accommodation to the public and the pay received does not more than cover the expense of handling.

A Heavy Freight Carrying Railway*

More Than Half of the Earnings Come from Freight —Through Rates and Percentages Have Been Established with Many Steam Railroads

BY A. C. WEGNER
Traffic Manager the Toledo & Western Railroad Company, Toledo, Ohio

Any electric railway that is in position to establish freight service on its lines opens up a source of revenue to that company which, with proper development, will add materially to the road's earnings. On our line, where freight service has been given considerable attention, freight revenues amount to better than 50 per cent of the total earnings.

We have been successful in establishing through rates and percentages with many steam railroads. This has enabled us to locate on our line grain elevators, flour mills, hay sheds, cooperage factories, canning factories, brick and tile plants, lumber and coal yards, one milk

*The physical characteristics of the Toledo & Western Railroad as adapted to freight handling were described in Electric Railway Journal, page 1055, Nov. 18, 1916.

condensory, a paper mill and one of the largest beet sugar refining plants in this section of the country. The establishment of these through rates has enabled the dealers in these products located on our line to dispose of their goods at almost any market on a through rate, giving them the same advantages that dealers in these same commodities in adjacent towns located on steam railroads enjoy.

By the establishing of rates on lumber and forest products from North Pacific Coast points, Southern points, and Michigan and Wisconsin points, lumber yards have been established at various places and enjoy the same advantage as if located on a steam railroad. The same applies to coal, through rates being established on bituminous coal from Ohio and West Virginia fields, as well as on anthracite from Pennsylvania fields.

At one point on our line we have direct track connections with a sugar refining plant. During the season just finished, we handled approximately 1000 carloads (in standard freight equipment) of sugar beets to this plant. Most of these beets originated on our own line, but several hundred carloads came from various steam railroads, which published through rates on this commodity in connection with our line. We also handled close to 100 carloads from points on our line to Toledo for delivery to the sugar plant located at that point, making a total of about 1100 carloads of sugar beets this season. On account of the extremely dry summer it was an off year on beets in tonnage. During the season of 1915, with more favorable crop conditions, we handled for both points 1995 carloads of beets. We will have handled before the season is over from the plant located on our line about 300 carloads of beet sugar and beet refuse or pulp, moving off our line to various points in connection with those steam lines with which we have through rates.

Another big source of freight revenue is the handling of crushed stone for stone road building purposes. During 1916 we handled between 2000 and 2500 carloads of this class of freight, which, bringing on an average of $16 per car, shows a very handsome addition to our earnings.

We have established stock pens at all points, enabling live stock dealers to drive their stock in and load from there directly into the car. Some of this stock moves to Toledo over our rails and some to Buffalo, Chicago, Cleveland and other markets in connection with the steam roads with which we have through rates published to destination.

Our line passes through a rich farming country and carries a large amount of milk and cream. Located at Morenci, Mich., is a large milk condensory, owned by a company which also has a plant at Toledo, our eastern terminus. Starting in a small way, its milk business over our line has increased wonderfully in the past few years. Formerly the milk was handled in our regularly scheduled package freight cars, along with other traffic. After some time the total number of cans increased to such an extent that it was necessary for us to establish a milk run, which handles nothing but fresh milk from Morenci and intermediate points to Toledo. By advertising the establishing of this milk run among farmers and the different dairies it was not long before this train carried its full capacity load. On many days it amounts to more than this special can handle, and the remainder is brought in by the next scheduled freight car.

Later on the dairy company began to bottle the milk at the Morenci plant, cool it there, and now ships it out in standard refrigerator cars over our line to our Toledo terminal, from which it is switched to the private side track of the dairy company. Arriving there about midnight, it is checked out to the wagons of the company. This plan results in the milk being delivered at the door of the consumer during the early morning hours. At the present time this business has been increased to two carloads per day, and by next spring it is expected that this will be increased to three carloads per day. Milk being a high-rate commodity, this particular traffic is most desirable.

As our line is known as a heavy freight carrying electric railway, I feel warranted in saying that the electric lines must look to the development of freight traffic on their lines in order to show any substantial increase in revenue, and so far we are well pleased with the showing our line has made in that phase of railway traffic.

A Far Western Experience

Seven Definite Recommendations Given for Development of Freight Business—Experience and Ability Form the Combination That Will Succeed

BY W. H. SOMERS
Traffic Manager Puget Sound Railway, Pacific Northwest Traction Company, Puget Sound Traction, Light & Power Company, Seattle, Wash.

The development of freight traffic is an important phase of the freight business. Good service and adequate facilities are requisites and should be provided to the extent that the present and prospective business justifies. Insofar as special facilities are concerned it is doubtful if small lines can afford to speculate on the future in making permanent investments in auxiliaries such as grain elevators, lumber sheds, warehouses, etc., for the encouragement of freight tonnage, unless under exceptionally favorable circumstances which are likely to be very rare.

To be successful, special facilities of this character should be advantageous to the shippers. In fact they should be more or less of a necessity. They should therefore be paid for and maintained by the shippers or handled as a commercial proposition and not as a railway facility. It should, however, be the duty of the transportation company to seek opportunities to encourage the location of warehouses along its lines. Nominal or low rental charges for locations on the railway company's property and a proper basis of rates that will equalize competitive conditions are among the attractions that may be offered.

If the shipper has his money invested in these facilities it virtually makes him a partner in the business, and the railway company is assured of his patronage. Otherwise, the transportation line has no command of the situation.

Insofar as new methods of developing freight traffic are concerned, it may be stated that the evolution of the business has been gradual and not prolific in new discoveries or new methods. The usual means are generally known to experienced freight officials, but they are of varying adaptability and each field seems to present its own intricacies. Success on electric lines is more likely of attainment through the intensive development of the usual methods as applicable to the local situation, than in dependence on new methods.

It is doubtful if any set of practices can be laid down for general guidance, as the conditions vary. There are, however, certain methods that should ordinarily suggest themselves and among them may be mentioned the following:

1. Provide adequate and reliable service.
2. Learn the needs of shippers and endeavor to supply them.

3. Familiarize the shippers with your advantages.

4. Arrange joint rates with steam roads and electric lines where opportunity offers, thereby extending the range of operations.

5. Endeavor to have the points of supply or consumption of products or material changed so that participation in the transportation may be possible.

6. Extend spur tracks into industries where the present or prospective business amply justifies the expense.

7. Encourage the location of new industries along the line, and the enlargement of old ones.

Satisfactory results have been produced through the application of the methods mentioned, but there is one outstanding and essential qualification which virtually embodies them all, and that is practical experience. Methods and formulas may be readily obtained or devised, but successful results are dependent upon the amount of experience and practical knowledge that enters into their execution. What is true of practically every other line of endeavor is equally true of the freight business, and the different results obtained by experience and inexperience may bear but slight resemblance.

The average electric line bears the same relation to the large steam road as the small tract does to the large farm. Intensive methods should govern the former while extensive means are usually applied to the latter in each case. With the electric line, as with the small tract, success is dependent largely upon the accumulative results of diversified efforts, and in both cases the accomplishments will be in about the same measure as the experience and ability.

It is entirely possible for one inexperienced in the freight business to be daily treading upon opportunities without being conscious of their existence—or who upon recognition is unable to appraise them at their proper value. Likewise opportunities may be wasted by inexperienced effort. It is not sufficient to be able to read tariffs and quote rates. One should know the principle on which rates are based and the rate merit of the principal commodities. Otherwise he may not know whether the movement of certain commodities is being retarded or whether the revenue obtained is relatively adequate in upholding the general average.

It is not sufficient to be conversant with one's own rates and service. A traffic official should have general knowledge of the activities of the shippers insofar as they pertain to transportation and to present and prospective markets.

It is not sufficient to assemble an array of methods of other lines and automatically try to put them into practice without full regard to their local application. The local adaptability and the manner of execution may minimize or magnify the results. The variance in the results obtained is due not so much to the knowledge of general methods as to the ability to recognize and develop opportunities.

It is therefore evident that experience is the basis of success in the electric lines' freight business, first in determining the extent to which they should engage in freight operations, and second, in the development work. Experience and ability, in conjunction with the devotion of thought and effort, are the combination that will succeed, and without that combination methods and formulas are of only secondary value.

Small electric lines may feel that their business does not justify the expense of an experienced freight official. However, this should not deter them from the effort to equip themselves properly with talent, and what cannot be done individually may be entirely possible of accomplishment collectively. Therein will lie a measurable achievement in the development and upbuilding of the freight business of a number of the electric lines.

Decreasing Accidents Through a Bonus System

Milwaukee Employees Receive 40 Per Cent of Savings from Injury and Damage Allowance—Participation Based on Demerit System

THE Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has in operation a bonus plan whereby employees in the transportation department receive part of the savings secured by more careful attention to the prevention of injuries and accidents. According to Bruce Cameron, superintendent of transportation United Railways, St. Louis, Mo., who made an investigation of the system in Milwaukee and submitted a report to President Richard McCulloch, the employees in Milwaukee are enthusiastic over the success of the plan during its eighteen months of operation.

Mr. Cameron's report, which was abstracted in a recent issue of the *United Railways Bulletin*, stated that a certain per cent of the gross revenue of the Milwaukee Electric Railway & Light Company is set aside each year to pay injury and damage expenses arising from the operation of the cars. Any saving made from the allowance is partly distributed in the form of a bonus to the employees in the transportation department. If, for example, $500,000 is set aside to meet injury and damage payments and only $400,000 is expended because of increased care and intelligent operation of the cars, 40 per cent of this $100,000 saving (or $40,000) is divided among the employees. A similar percentage goes to the company, and the remaining 20 per cent into a fund for keeping the records. The bonus paid to the men is in addition to the present wage scale and system of compensating the employees according to the length of service.

The motormen and other employees who are entitled to receive a bonus draw 73 per cent of the employees' share, and the conductors entitled to a bonus draw the remaining 27 per cent. The bonuses received by the motormen and conductors climbed steadily during the first year until the motormen were earning $7 extra each month and the conductors about $5 each month. The other employees in the transportation department, such as division superintendents, supervisors, foremen, clerks and miscellaneous car service men, received approximately the same amount of extra money. All employees are figured on the same average of earning capacity, about $1,200 each year, so that the motormen and conductors have an almost equal standing with the superintendents, supervisors and foremen.

In addition to the money allowed to meet injury and damage payments, the report says that another sum is set aside for the maintenance of equipment. If by careful operation there are fewer collisions and less property is destroyed, the difference between the allowance and the cost of repairs and replacements is divided. Moreover, the saving in power through the intelligent operation of the cars figures in the bonus appropriation. A certain sum is also established as the reasonable earnings per car-mile, and if every car hauls its own load, keeps on its own space or secures increased fares, the difference earned above the sum designated is divided among the employees.

The right of employees to share in the bonus distribution is determined from their records. The company has a grade book, and all infractions of rules carry with them a certain number of demerit marks. At the first of the month each employee starts out with 1000 merit marks to his credit. If he is demerited in accordance with the grade book and fails to maintain a grade of 750 points, he loses the right to participate in the bonus for that month, while the careful and

efficient profit through his carelessness. Any employee demerited 250 points in three consecutive months is liable to dismissal. The demerits for each accident or violation of rules are determined in the first instance by the division superintendent, the right of appeal being reserved in turn to the bonus committee, the superintendent of transportation and the general manager or president.

The bonus committee at each carhouse consists of the division superintendent as chairman, the director of the Employees' Mutual Benefit Association from that carhouse, and another employee of the transportation department. If the director happens to be a motorman, then a conductor is elected to be the other representative, and vice versa. The motorman or conductor chosen must have a service record of at least three years with the company and be in good standing.

There are no lay-offs or suspensions on account of infractions of the rules of the grade book. The division superintendent posts the demerits in the assembly room of the carhouse. The superintendents, supervisors, foremen, clerks, etc., are demerited on account of infractions of the rules the same as motormen and conductors. Their infractions pertain particularly to negligence in not looking after the cars, letting a space go by unattended, not furnishing the proper service or not attending to duty in any other way.

The Milwaukee plan, according to Superintendent Cameron, gives all employees of the transportation department direct responsibility and interest in reducing the cost of operation, increased safety and revenues from car operation, provides a system for enforcing discipline, and recognizes and rewards the services of efficient men whose treatment of the public earns good will for the company.

Extension of Milwaukee Electrification

Chicago, Milwaukee & St. Paul Railway Authorizes Electrification of Two New Engine Divisions Totaling 220 Miles in Length

THE electrification of two additional engine divisions has been authorized by the directors of the Chicago, Milwaukee & St. Paul Railway. These two divisions lie between the city of Seattle and the division terminal of Othello, about 220 miles to the east, crossing the Cascade Mountains and extending for some distance onto the relatively level plain that comprises the eastern part of the state of Washington. Eastward from Othello, across this plain, there will thus be a gap of somewhat more than 200 miles that is not included in the immediate plans for extension of the electrically-operated line. Temporarily, at least, the division point at Avery, Idaho, which lies at the foot of the Bitter Root Mountains, will remain the western terminus of the original 440-mile electric zone that is now being operated. Ultimately, however, the plan is to establish electric operation over the entire western end of the system, giving a stretch of nearly 900 miles of electrified track between Harlowtown, Mont., and the Pacific Coast.

C. A. Goodnow, assistant to the president, Chicago, Milwaukee & St. Paul Railway, is quoted to the effect that the new electrification through the Cascade Mountains is being undertaken because of the phenomenal success of the electric zone already completed, the outstanding feature of this being the ease with which heavy freight trains are being handled on the mountain grades. Five freight trains of about sixty cars each are moved daily each way across the mountains by the electric locomotives, and it is estimated that four hours' time are saved by each train on each 100 miles of road.

Surveys for the new work have already been made, and the line will be placed in service as soon as possible. No orders for equipment have been placed as yet, but the same type of apparatus, including locomotives, substations and overhead, as that now installed on the present electric zone will be adopted. This involves the use of 3000 volts direct current supplied from substations spaced about 30 miles apart. Power is received at 100,000 volts and is converted by motor-generator sets which supply a catenary contact system with twin copper contact wires supported on wooden poles with bracket arms. The locomotives are of 280 tons weight and are equipped with eight motors of 450 hp. each.

Commission Can Increase Fares Without Municipal Consent

New York Court Holds That Utilities Have Right to Reasonable Rates Despite Franchise Restrictions Imposed by Cities

AN important contribution to legal interpretations of the Public Service Commission law of New York State was recently made by the Appellate Division of the Supreme Court, Third Department, when it overruled the Public Service Commission for the Second District of New York and held that the commission could authorize increased fares beyond the stipulated franchise rate without the assent of local authorities. This decision was rendered in the case of the New York & North Shore Traction Company, Roslyn, N. Y., against the above-mentioned commission (162 N. Y. Supp. 405).

In 1907, the company, then bearing the name of the Mineola, Roslyn & Port Washington Traction Company, secured municipal permission for construction, one condition being that the traction company and its successors should not charge more than 10 cents for a continuous trip from Mineola to Port Washington. In 1915 the company applied to the commission for a fare increase, alleging that 10 cents was unjust and unreasonable. The commission, however, held that, although facts were alleged which, if established, would be ample to warrant the granting of the order sought, it could not, without the consent of the local authorities, increase the fare beyond that set in the original consent.

The ruling just rendered on appeal, however, completely nullifies the decision of the commission and remits the petition for a fare increase to it for further action. The court remarks that the Legislature is prohibited by the constitution from authorizing the construction and operation of street railways except upon the condition that the consent of the local authorities be first obtained. It adds, however, that under another constitutional provision that must be considered in this connection, the local authorities are prohibited from attaching conditions to their consent which assume to regulate the rate of fare, because the right to regulate fares to be charged by public service corporations is essentially a legislative function. This power, of course, is now delegated to the Public Service Commission. In other words, the constitutional provision regarding the giving of consent is a restriction upon the Legislature; and the constitutional provision regarding the exercise of the legislative power is a restriction upon the local authorities in the matter of attaching conditions fixing rates of fares. The court recalls that under a previous decision (196 N. Y. 158, 165) the consent of a city is but a step in the grant of a single, indivisible franchise to construct and operate a street railway, for the authority to make use of the streets for railroad purposes primarily resides in the the State and is a part of its sovereign power.

In conclusion, the court states:

"The Public Service Commission, without the assent of the local authorities, is vested with power to increase the rate of fare on the company's line between Mineola and Port Washington beyond the stipulated rate, in case the proofs shall warrant the decision that the present rate of fare is insufficient to yield a reasonable compensation for the service rendered, and is unjust and unreasonable."

COMMUNICATIONS

Changes Needed in Laws Affecting Personal Injury Suits

SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS
OAKLAND, CAL., Jan. 18, 1917.

To the Editors:

Judicial decisions which have established the legal principles under which are decided street railway personal injury cases are the outgrowth of conditions existing when the electric railway was in its earlier stages of development. In other words, the laws under which such cases must be tried do not suit present conditions. The present situation, involving an unfair burden upon the electric railways, could probably be remedied if the facts were made plain and the electric railways of the country would co-operate to secure the necessary changes in state laws.

When the electric street car first appeared and for years thereafter it was regarded as a strange and unusual method of transportation. The source and application of the energy it used was not generally understood. Its capacity for injury and damage appeared to be large as compared with the slower moving vehicles of the day. The electric car seemed to be in a class by itself, and the burden of extraordinary care and responsibility was placed upon those who operated it. Early legal cases which were decided unfavorably to the electric roads strengthened the popular belief that the electric railway was a dangerous means of travel, and the tendency was to increase the burden upon electric railways.

In the last two decades there has been but slight change in the legal status under which are considered damage and personal injury cases involving electric railways, yet in this time the relative position of the street railway to other common methods of travel has been practically reversed. The swiftly moving automobile in both private and jitney service, with its extremely high rate of acceleration, the heavily laden automobile truck and the large sightseeing automobiles which often carry as many passengers as the street car have increased the traffic dangers many fold. Meantime the improvement of the mechanism of the street car has materially increased the safety of its operation.

Judicial decisions, taking account of changed transportation conditions, so far as pedestrians, automobiles and horsedrawn vehicles are concerned, have kept pace with modern developments with the single exception of the electric railway. The street car is still governed by laws which deal with it as an exception in transportation equipment, potentially as dangerous and to be saddled with the same relative degree of responsibility as during the early years of its development.

Judicial decisions have recognized that a street car must of necessity travel along a fixed path, but they usually fail to determine any principle of right-of-way between street car and automobile. Traffic laws show the same deficiency. Only recently was the passage of a traffic ordinance secured in Oakland, Cal., which gave to street cars at intersecting streets a right-of-way over automobiles. The facility with which automobiles can stop is recognized, but street cars are still held rigidly responsible for the failure of motormen to stop in time to avoid collisions, while, on the other hand, the negligence of an automobile driver cannot be imputed to the passenger or guest in the automobile.

There would be a decrease in "ambulance chasing" and unfounded litigation against street railways as a means to a financial end would be discouraged if the much needed revision of the present laws could be secured. The street railway is a fertile field for exploitation in personal injury suits because only large corporations, always able to respond in damage cases, engage in this field. One element in the situation which requires a change most urgently is that trial costs of a personal injury case have to be paid by the winning party with a judgment for costs against the losing party. Thus unscrupulous lawyers need not hesitate in urging suits against the company on a 50-50 basis. Neither lawyer nor client undertakes risk because in case of decision unfavorable to the client means are easily found to evade the payment of costs by the plaintiff, and the railway company has to stand the loss entailed by the purely mercenary scheme of the "ambulance chaser."

W. H. SMITH, Attorney.

Were the Paving Repairs Useless?

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., Jan. 30, 1917.

To the Editors:

Referring to your editorial on "Useless Repairs to Street Paving," in the issue for Jan. 27, I wonder whether you made inquiry of the maintenance engineer as to why the paving work was being done despite the bad-joint conditions. A situation arises quite often on a large property where one is confronted with a choice between two evils. It can be imagined that the city authorities may have ordered the paving repairs on the street to be done in a specified time without consideration of the ability of the railway to find the men and stop other work of more importance in order to make the joint repairs before the paving work. It not infrequently happens that the city will step in, regardless of requirements from a track viewpoint, and do the paving work at the railroad's expense with the later joint repair still to be done at further expense. Then, too, very bad paving conditions are not good to leave over a winter season, and accident hazard often outweighs all others to such an extent that the temporary repair of paving at the poor joints may be warranted. Furthermore, if the tracks in question are to be rebuilt early this spring, the failure to make joint repairs had a justification in the avoidance of the joint repair expense. It hardly seems conceivable that any official charged with track maintenance would permit the work criticised under any other conditions.

R. C. CRAM,
Assistant Engineer Way and Structure Department.

The Illinois Traction Company, Peoria, Ill., knewn as the McKinley lines, E. E. Soules, manager of the department of publicity, has sent a greeting in the form of a handsomely lithographed card 5¼ in. wide by 3¼ in. high to the editors of the newspapers in the company's territory. The card contained this expression of appreciation: "The good will you have shown us is a valued asset for which we owe you our sincere thanks and our best efforts to serve you during the coming year."

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

Simplification of Wheel Flange Designs Considered by Equipment Committee—Engineering-Accounting Topics Discussed at New York Meeting—Personnel of Standards Committee Announced—Report of Chicago Section Meeting

Flange Contours Discussed by Equipment Committee

Wheel flange contours constituted the major subject of discussion at a meeting of the equipment committee of the Engineering Association held in New York, Jan. 30. E. M. T. Ryder of the committee on way matters attended the meeting and asked for consideration of the possibility of adopting a single standard flange to permit standardization of city special work. The question was raised as to the possibility of providing for M.C.B. flanges in city track, and also in regard to the possible use of a single city flange.

It was conceded that the opportunity to bring interchange equipment with M.C.B. flanges into cities would be most desirable, but the sense of the committee was that no way was apparent to eliminate the present mongrel interurban flange that stands between the M.C.B. design and that frequently used for city cars.

Mr. Ryder then asked for the adoption, if possible, of a single standard thickness of 1 1/16 in. for all flanges, whether for interurban or city wheels, but with varying heights to suit special conditions, and it was decided to canvass a selected list of member companies to determine sentiment in this regard. The query is to be whether a single standard flange thickness is feasible with the three heights, respectively, 5/8 in., 3/4 in. and 7/8 in., the 5/8-in. flange being introduced because of its not inconsiderable use at present.

The balance of the meeting was occupied with reports from sub-committees on revision of the various standards of the association. Among these the most radical proposal was that of eliminating that section of the Engineering Manual included under the head of "Miscellaneous Methods and Practices." The consensus of opinion was that the material had but little value, especially because much of it had not been brought up to date. The matter was referred to the executive committee.

The meeting was attended by H. A. Johnson, E. W. Holst, W. E. Johnson, J. J. Sinclair, J. R. Ayers, R. H. Dalgleish and W. G. Gove, chairman, together with representatives of a number of manufacturers who were serving on sub-committees.

Engineering-Accounting

The first meeting of the engineering-accounting committee for 1917 was held at association headquarters on Jan. 22 and 23. Harold Bates, New Haven, Conn., chairman of the committee, presided, and the following other members were in attendance on the first day: J. C. Collins, Rochester, N. Y.; H. A. Gidney, Boston, Mass.; C. H. Lahr, Akron, Ohio; E. P. Roundey, Syracuse, N. Y., and F. H. Sillick, New York City. On the second day J. M. Joel, Utica, N. Y., and W. O. Ingle, Rochester, N. Y., attended the meeting.

The first of the two subjects assigned to the committee is that of interdepartmental charges. The various phases of this subject were thoroughly discussed by the committee, a review also being made of past discussions and recommendations by former committees. It seemed to be generally agreed that the inclusion of interdepartmental with overhead charges in street railway construction and operation is correct in principle and necessary to determine the true cost, and also that some system of cost accounting supplemental to the regular prescribed accounts is desirable. In consequence a sub-committee, consisting of F. H. Sillick, chairman, H. A. Gidney and J. P. Ripley, was appointed with instructions to devise a method of determining an apportionment of shop and power expenses for construction and operation in interdepartmental charges, defining the elements to be considered as so-called overhead charges.

Consideration of the foregoing subject took up most of the first day with the exception of a short discussion of the second topic assigned the committee—the further development of a system for maintaining a continuous inventory of physical property. A second sub-committee to handle this work was appointed, consisting of C. H. Lahr, chairman, L. P. Crecelius and J. C. Collins.

On the second day the discussion of continuous inventories and the system drawn up by the 1916 committee was continued, and certain suggestions were made to the sub-committee, including: (1) A revision of the index system. (2) A consolidation of the primary forms for reporting property changes to the inventory department into one suitable for all cases. (3) The design of sub-forms for the reporting of information by men in the field. (4) A testing out or application of the system outlined by the 1916 committee to disclose any other ways to make improvements.

Engineering Standards Committee

As stated in last week's issue the Engineering Association committee on standards will not consist as heretofore of the chairmen of the technical committees, the purpose of the change being to bring in a group not directly responsible for the committees' recommendations. The 1916-1917 committee consists of the following:

H. H. Adams, Chicago, Ill., chairman; J. H. Hanna, Washington, D. C., vice-chairman; G. W. Palmer, Jr., Boston, Mass.; John Lindall, Boston, Mass.; Martin Schreiber, Newark, N. J.; L. P. Crecelius, Cleveland, Ohio; J. M. Larned, Pittsburgh, Pa.; E. R. Hill, New York City; H. H. Norris, New York City.

Chicago Section Meeting

At the meeting of company section No. 6, held in Chicago on Jan. 16, 130 members and visitors were present to listen to an address by H. M. Brinkerhoff, chief engineer Chicago Transportation and Subway Commission. Mr. Brinkerhoff spoke on "Chicago's Transportation Problem," and used maps of the city showing the proposed extension of the present elevated lines, the new elevated lines and the proposed subways by way of illustrations. He also explained the plans proposed for financing the work and equipping the system ready for operation. During the evening the trio from the Elevated electrical department furnished excellent music.

Practical and Economical Solutions of Problems in

EQUIPMENT AND ITS MAINTENANCE

Classification of Trucks to Aid Builders and Users—Improved Switch Mate in B.R.T. Standards—Ballast Spreading with Great Economy of Labor—How to Assemble Pinions Correctly—Big job Done with Pole Jacks—Light Weight Portable Welding Furnaces

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Tongue Switch and Mate Standards

Unusually Large Mate Center Found Economical on B. R. T. System

BY M. BERNARD
Assistant Engineer Way and Structure Department

In this issue of the ELECTRIC RAILWAY JOURNAL for July 22, 1916, page 148, the standard track layout designs of the Brooklyn Rapid Transit System were described. The present article deals with standard tongue switches and mates adopted on the same system.

It was considered impracticable to specify any special type of fastening or heel, exception being taken, however, to the use of pin tongues, since the tongue switches furnished by the various manufacturers have certain special features in their design which are covered by patents. The accompanying drawing shows the alignment and face dimensions adopted for the switches and mates together with profiles of switch surfaces.

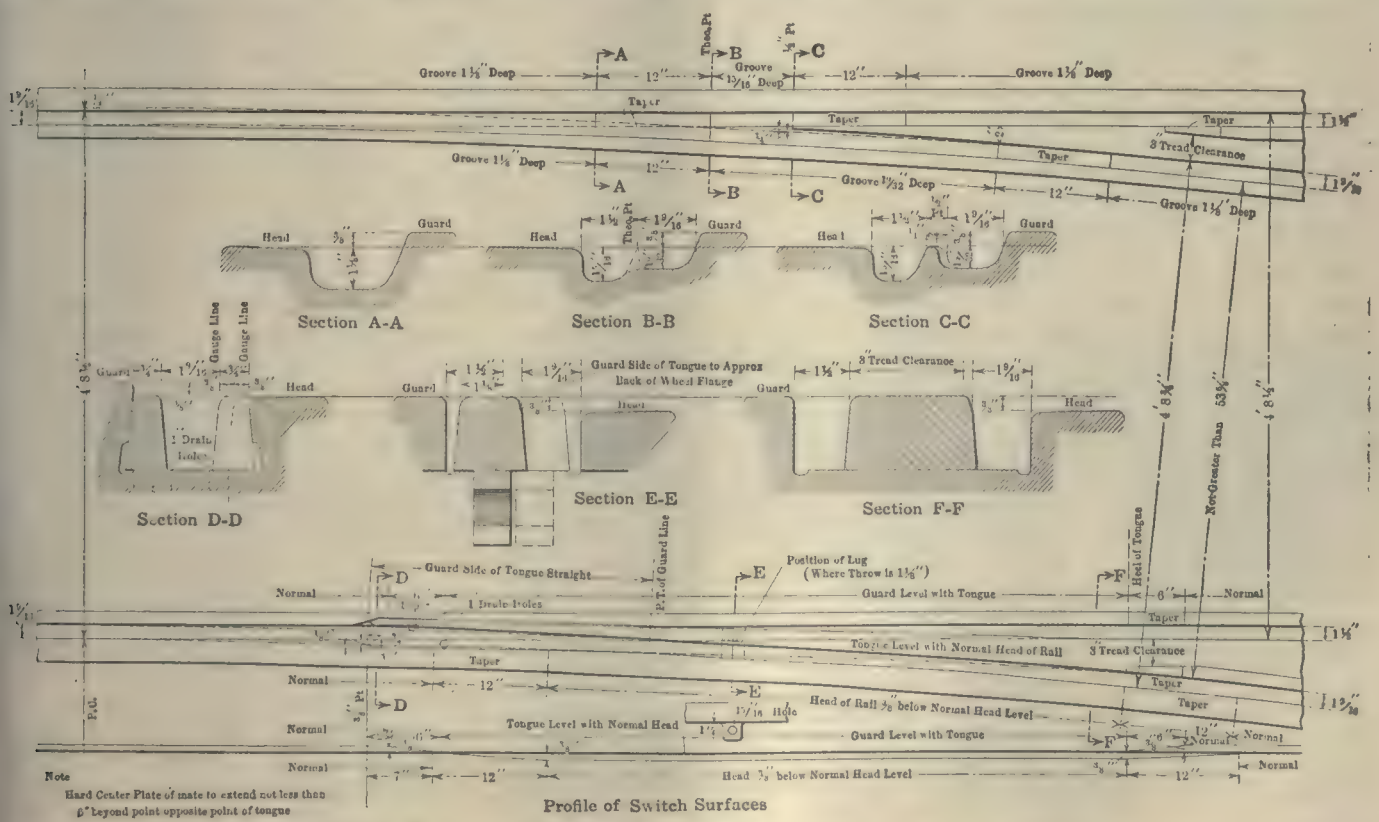
Attention is called, especially, to the comparatively large mate center whereby protection is afforded to the mate opposite the tongue point, mates generally being designed with manganese steel inserts to protect the mate point only. It is believed that by extending the center in the mate to a point approximately opposite



VIEW SHOWING GOUGING OUT AT TOE OF SWITCH MATE

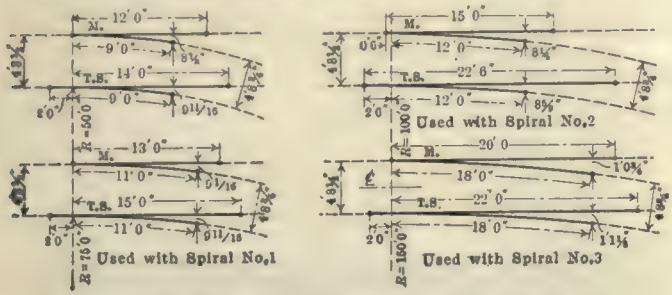
the end of the tongue switch center, the pounding and gouging out of the open-hearth steel, frequently found in mates at the point, will be greatly reduced or entirely eliminated. This gouging out at the toe is illustrated in the accompanying photograph. Experience thus far shows that the additional cost for this improvement is well justified.

The lengths adopted as standard for tongue switches



ALIGNMENT AND FACE DIMENSIONS OF STANDARD TONGUE SWITCHES AND MATES OF THE BROOKLYN RAPID TRANSIT COMPANY

of 50-ft., 75-ft., 100-ft. and 150-ft. radii are given in the diagrams below. The curved arms are made in the lengths as shown to permit their use with any one of the standard spirals regardless of the radius of the abutting portion of the curve of which the switch piece forms a part. This would not be possible if the lengths were



STANDARD LENGTHS OF SWITCHES AND MATES ON B. R. T. SYSTEM

made greater since the radius of the abutting arc varies according to the design adopted for the special work layout. Likewise, it would be impossible, without rebending the end portion, to use switches having greater lengths than these in connection with cross overs, whose design embodies, generally, a uniform radius at the ends with straight frogs in the middle portion.

Truck Classification

The Author Advocates Use of a Uniform System of Symbols for Defining the Various Classes of Electric Railway Car Trucks

BY S. A. BULLOCK
Manager Electric Truck Department, Baldwin Locomotive Works, Philadelphia, Pa.

In this day of efficiency and standardization it seems strange that little effort has been directed toward a truck classification that really defines—a universal classification that has face value and is not entirely empirical.

Steam locomotives are definitely classified by the location and number of wheels. For instance, 2-4-2 indicates an engine with two idler wheels under the front end, four drivers under the boiler and two trailers under the rear end of the locomotive. With electric railway car trucks one finds such classifications as 39-E-1, 0-36, and 54-18-M. Does anyone aside from the manufacturers know how to compare them? Why not make the name define the object?

This is by no means the case at present. For example, 39-E-1 represents a Brill maximum traction truck with one outside-hung motor per truck. The wheelbase is 54 in. and the maximum center plate load 20,000 lb., the journals being 3¾ in. x 7 in. for drivers and 3 in. x 6 in. on trailers. 0-36 represents the Standard Motor Truck Company's maximum-traction truck, with wheelbase 54 in., center-plate load 18,000 lb., journals 3¾ x 7½ in. for drivers and 3 in. x 7¼ in. on trailers. 54-18-M represents a Baldwin maximum-traction truck, with wheelbase 54 in., center-plate load 18,000 lb., journals 3¾ in. x 7 in. for drivers and 3 in. x 6 in. on trailers.

Baldwin's present method of defining a truck class is that the first figures indicate the wheelbase in inches, the second figures represent the maximum center plate load in thousands of pounds and the final letter indicates the style of truck. Thus, 54-18-M indicates a motor truck, whose wheelbase is 54 in. whose center plate load is 18,000 lb. and whose type is maximum traction, ("maximum traction" is a misnomer, as here applied, and should be "maximum clearance").

The large table below gives an approximate relative comparison of the electric motor-truck classes of Brill, Standard and Baldwin.

In studying truck classifications, these are three essentials: (1) The motors—number per truck—inside or outside hung; (2) The wheelbase; (3) The capacity of the truck. It seems reasonable to formulate from this the following general plan:

The first three classes in the above table could be generally defined by the symbols 1-0-54-36, or preferably 10-54-36. Here the first figure, 1, represents the number of motors per truck. The second figure, 0, is the letter O, meaning outside hung, and represents the location of the motors in the trucks. The figure 54 means inches of wheelbase, and 36 means thousands of pounds load on two trucks. Thus, 1—(motor), O—(outside hung), 54—(inches wheelbase), 36—(thousand pounds maximum carrying capacity of the two trucks), is truck class 10-54-36. For inside hung motor trucks, there could be used, after the number of motors, the figure 1 (or I, meaning inside hung). In order not to confuse the numbers, they should be read thus, Baldwin 21 dash 84 dash 60.

The practical application of this plan would result in the following list of symbols:

Brill.....39—E—1	Brill ..... 10—54—40
Standard..... O—36	Standard ..... 10—54—36
Baldwin.....54—18—M	Baldwin ..... 10—54—36
Brill.....76—E—1	Brill ..... 20—58—40
Standard..... O—50	Standard ..... 20—54—50
Baldwin.....54—18—L	Baldwin ..... 20—54—36
Brill.....27—MCB—1	Brill ..... 21—72—46
Standard..... C—50	Standard ..... 21—76—50
Baldwin.....73—22—K	Baldwin ..... 21—73—44
Brill.....27—MCB—2x	Brill ..... 21—72—46
Standard..... C—50	Standard ..... 21—76—50
Baldwin.....75—25—A	Baldwin ..... 21—75—50
Brill.....27—MCB—3x	Brill ..... 21—78—63
Standard..... C—60	Standard ..... 21—78—60
Baldwin.....84—30—AA	Baldwin ..... 21—84—60

A proper classification would lead eventually to a standardization of axle sizes, which should not have to be specified since every truck should carry with it definite standard axles.

I have endeavored to formulate a classification which is simple, definite and comparative. It is impossible to work out a scheme which is "foolproof" or one which

Company	Classification Symbol	Wheel Base, Inches	Center-Plate Load, Pounds
Brill	39—E—1	54	20 000
Standard	O—36	54	18,000
Baldwin	54—18—M	54	18,000
Brill	76—E—1	58	20,000
Standard	O—50	54	25,000
Baldwin	54—18—L	54	18,000
Brill	27—MCB—1	72	23,000
Standard	C—50	76	25,000
Baldwin	73—22—K	73	22,000
Brill	27—MCB—2	72	23 000
Standard	C—50	76	25,000
Baldwin	75—25—A	75	25,000
Brill	27—MCB—3	78	31,500
Standard	C—60	78	30,000
Baldwin	84—30—AA	84	30,000

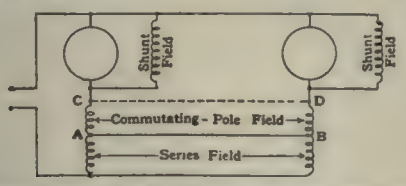
Type City	Location of Motor	Journals Motor and Trailer Inches
Single Motor	Outside hung	3¾ x 7 and 3 x 6
Single Motor	Outside hung	3¾ x 7½ and 3 x 7¼
Single Motor	Outside hung	3¾ x 7 and 3 x 6
City		
Double Motor	Outside hung	3¾ x 7
Double Motor	Outside hung	3¾ x 7¾
Double Motor	Outside hung	3¾ x 7
Suburban		
Double Motor	Inside hung	3¾ x 7
Double Motor	Inside hung	3¾ x 7
Double Motor	Inside hung	3¾ x 7
Interurban		
Double Motor	Inside hung	4¼ x 8
Double Motor	Inside hung	3¾ x 7
Double Motor	Inside hung	4¼ x 8
Interurban		
Double Motor	Inside hung	5 x 9
Double Motor	Inside hung	4¼ x 8
Double Motor	Inside hung	5 x 9

will not admit of exceptions. The proposed plan should, however, be useful in the majority of cases.

If the above classification should be designated "Universal" and if present truck classifications were parenthetically interpreted by equivalent universal classifications, it would enable the manufacturer to know exactly what is wanted and would help the customer to know what he is getting and what he already has.

Parallel Operation of D.C. Generators

It frequently becomes necesary in power houses and substations to operate d.c. generators in parallel, and when commutating pole machines are so used the *Electric Journal* points out that the brushes should be placed on the geometrical neutral and should be shifted only as



PARALLEL OPERATION OF D.C. GENERATORS SHOWING PROPER LOCATION OF EQUALIZER CONNECTION

a temporary emergency measure when parallel operation cannot be obtained in any other way. The commutating-pole winding should not be made to act as a series field, and should be used for the sole purpose of insuring good commutation at all loads. The equalizer connection should be between *A* and *B*, as shown in the accompanying diagram, and not between *C* and *D*.

Pittsburgh Harrow for Distributing Ballast

The Pittsburgh Railways, being located in the heart of a great metal working district, has suffered severely from labor shortage. Therefore the way department, in particular, had to set its wits to work to get along with as little human help as possible. One result has been the invention of a harrow for spreading ballast after it is deposited by dump cars. This harrow has been so successful that in one hour with two men it accomplishes as much work as eight men could in one day of hand shoveling.

The harrow, as shown in the illustration, is simply a triangular framework made of 2-in. x 1¼-in. x 12-in. board, with three stiffening ribs of the same material and sufficiently weighted to prevent climbing. To the outer boards are bolted iron teeth, which project 5 in. below the boards. When first used, the harrow was chained to the middle of each truck of the dump car which pulls it. However, experience has shown that it is better to attach it to the cabs, as this enables the harrow to follow curves.

After the dump cars have discharged the ballast, one of these drags the harrow back and forth three or four times over the stretch of 300 ft. to 400 ft. until the ballast is neatly spread; then a steam roller completes the work.

Protecting Public as Well as Operator from Rays of Electric Welder

In Kansas City where the safety-first movement is receiving much attention, the protection of the eyes of the curious public has been taken into consideration in conjunction with the use of the Indianapolis welder in building up worn special work at street intersections. For this purpose a cylindrical guard with an opening on one side through which the operator works is placed on end around the joint being built up. It is mounted on two wheels, so that it can be easily moved from one



SCREEN FOR SHIELDING EYES OF PASSERS-BY

location to another. Being about 4 ft. high and of the same diameter, it confines the violet rays from the arc so that they are not directly visible to the passers-by. In order to get the direct rays which are injurious to the eye, a person must come so close to the working point that the glare of the arc prevents him from looking injuriously long. The operator is provided with a headgear which protects his eyes and face.



HARROW SPREADING AS MUCH BALLAST IN FIFTEEN MINUTES AS EIGHT MEN COULD SPREAD WITH SHOVELS IN A DAY



View 1.—General view of Seaview Avenue, showing pole lines which had to be moved back 2 ft. on account of widening of the street.

View 2.—Pole leaning toward the street is ready to be shifted to the new curb line.

View 3.—Showing heavy loading of the poles near the power house.

Views 4 and 6.—Pole at power house supporting twenty cables.

View 5.—Pole shown in views 4 and 5 being raised with pole jacks.

View 7.—Two poles which were moved as a unit, using six pole jacks.

Views 8 and 9.—Showing how the concrete foundations were moved with the poles.

View 10.—Terminal poles opposite powerhouse which were moved as one unit.

Moving Live and Heavily Loaded Pole Line, Bridgeport, Conn.

Heavily Loaded Feeder Poles Moved with Pole Jacks

Poles Set in Concrete Shifted Without Interrupting Power When Widening of Street Required Pole Line to Be Moved Back Two Feet

BY GEORGE BUTTRICK
General Line Foreman Connecticut Company, Bridgeport, Conn.

The illustrations on the opposite page show work done on Seaview Avenue, Bridgeport, Conn., where on account of the widening of the street it was necessary to move the poles on both sides back a distance of 2 ft. Fifty-two 35-ft. extra-heavy steel poles set in concrete were moved into their new position without disturbing the cables, cutting off the power or destroying the concrete foundations. The views at the top of page 216 show a general layout of the line and how heavily the poles are loaded with cables. On the left-hand side of the street are nineteen 1,000,000-circ. mil cables and one 300,000-circ. mil cable, while the poles on the right-hand side carry twelve 1,000,000-circ. mil cables.

In moving a pole, a hole 6 ft. deep and about 4 ft. square was dug around the base. Blocks and timbers were then placed around the steel pole and two pole jacks, one on each side, were used to raise the pole with its load of cables at the top and its concrete foundation at the bottom. A 2-in. plank was then placed underneath and the pole pushed back the required 2 ft. by means of a third jack. This done, the hole was filled in and tamped in the usual manner.

Views 4, 5 and 6 show a pole at the side of the power station which was loaded with eleven 1,000,000-circ. mil cables and one 300,000-circ. mil cable, all carrying full railway voltage while being moved, and also eight 1,000,000-circ. mil negative cables which dead-end and run down the side of the pole in iron pipes leading into the power station. This entire load was held up with two pole jacks while a third jack was used to push it into the new position. Views 8 and 9 show the mass of concrete at the base of the pole. It was necessary to cut the negative cables in the ground and to splice in 2-ft. lengths of cable after the pole was moved.

The two poles shown in view 7 carry nineteen 1,000,000-circ. mil cables, one 300,000-circ. mil cable and the feeder taps, thus making the heaviest two poles of the entire job. These poles were moved together, concrete foundations and all, using four pole jacks for lifting and two for pushing the poles into their new location. View 10 shows two terminal poles on the opposite side of the street which were moved together in a similar way, using six pole jacks.

The work of moving the fifty-two poles was completed in twenty days with a force of five linemen, three groundmen and one foreman, at a cost of $10.25 per pole, not including the cost of pulling up the feeders and adjusting the slack.

Wood Block Pavement

Reports compiled by the various lumber associations show that the year 1916 marked the completion of a total of 25,000,000 sq. yd. of wooden block pavement in the United States. The use of this pavement has grown immensely in the last few years, especially in view of the discovery that it is more clinging to the automobile wheel than most other forms of pavement. The wooden block is being put in, in preference to other forms of pavement in the Middle West, in spite of the fact that its cost is greater, a slight degree in some places and as much as 50 per cent higher in other localities farther from the forests. The best estimates show that during 1916 approximately 2,500,000 sq. yd. of wood block pavement was laid. New Haven, Conn.; Detroit, Mich.; Minneapolis, Minn.; St. Paul, Minn., and Kansas City, Mo., laid more than 100,000 sq. yd. of it. About 1,000,000 sq. yd. of block were laid in factories during the year, among which was a contract for 30,000 yd. for the General Electric Company, Fort Wayne, Ind., plant.

Press or Shrink Fit Necessary in Putting on Pinions

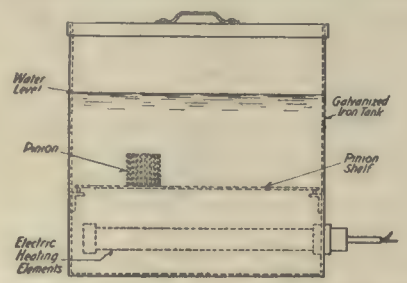
Key Will Not Drive Pinion if Care Is Used and Proper Methods Followed in Doing the Work

BY G. KRONFELD
Railway Department Westinghouse Electric & Manufacturing Company

Simply shoving on a pinion and tightening up the nut is not a satisfactory way of providing against loose pinions. Pinions should drive their gears through the press fit or shrink fit on the shaft and not through the key. The key acts merely as a safety device should the pinion accidentally loosen. The desired fit for the pinion can be had by heating or by pressing.

Before the application of a pinion on a tapered shaft the following precautions should be taken. See that the shaft is clean and free from burrs or swellings, and that the pinion bore is clean and free from burrs. The fit of the pinion bore should be in contact with at least three-quarters of the surface of the taper fit on the shaft. This can be checked by rubbing thin lamp black and oil on the pinion bore and fitting it on the shaft. The pinions should then be put on the shaft cold to make sure that the keyway in the pinion is the proper size for the key mounted on the shaft, and that the pinion does not ride or bind on the top and sides of the key and will not ride the key when pressed further on. The keyway on the pinion can be 0.002 in. larger, but not less than the key.

Pinions can be pressed cold onto the shaft with pressures of from 12 to 25 tons for pinions up to 125 hp., and 40 to 80 tons for pinions transmitting 125 hp. or over. Pinions with bores up to 3 in. that are pressed



ELECTRICALLY HEATED WATER TANK FOR PINIONS

on cold should advance on the shaft approximately 1/32 in.; those with 3-in. to 4-in. bores, 3/64 in.; and those with 4-in. to 5.5-in. bores, 1/16 in. This distance is measured from the point where the pinion is seated firmly on the shaft before pressing.

When shrinking on pinions for motors up to 125 hp. they should be heated in boiling water. When the bore is 3 in. or less they should be kept in the water for thirty minutes, and those with 3-in. or larger bore for sixty minutes. They should then be tapped on the shaft with a 6 or 8 lb. sledge hammer using a wooden or copper buffer. This sledging is not to get a driving fit, but to make sure that the pinion is home, and well seated.

To prevent rusting and to insure a clean surface at the fit, washing soda should be added to the water in the proportion of ¼ lb. of soda to 5 gal. of water. A convenient tank for heating pinions in water is shown in the accompanying illustration.

Pinions for motors over 125 hp. should be heated with a gas flame applied in the bore of the pinion in such a

manner as not to touch the teeth of the pinion as this might affect the temper. The flame should be so regulated as to take forty-five to seventy-five minutes to bring the pinion to a temperature of 257 to 302 deg. Fahr. The temperature can be measured by placing the bulb of a thermometer against the pinion between the teeth. The surface of the pinion where the bulb touches it must be made perfectly clean by rubbing with emery cloth. It is also important to protect the exposed part of the thermometer by covering it with asbestos cloth so the flame cannot touch the thermometer. When the pinion has reached the correct temperature the pinion is put on the shaft in the same manner as given for pinions for motors up to 125 hp.

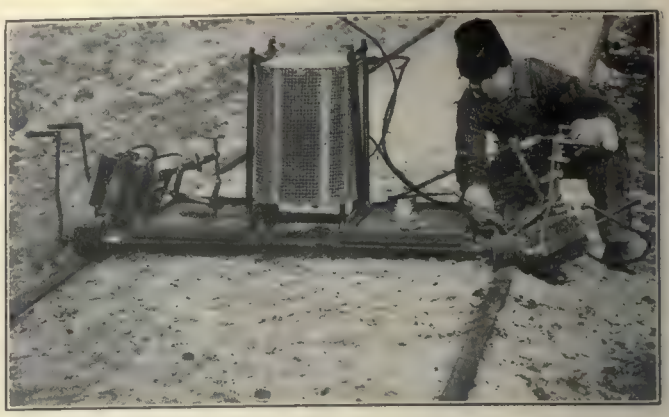
Pinions put on after boiling in water will hold when cool with a pressure of from 12 to 25 tons, and those heated above 257 deg. Fahr., but not above 302 deg. Fahr. with a pressure of from 40 to 80 tons, depending on the length of fit of pinion and diameter of bore.

Portable Welder for Track Bonding

In order to provide a means of installing electrically welded bonds, which would be within the economic possibilities of every railway, however small, the Electric Railway Improvement Company, Cleveland, Ohio, has developed a portable welder to supplement its bonding car. This apparatus is extremely simple, consisting merely of a resistance element weighing about 200 lb., and an electric furnace weighing 65 lb. The function of the outfit is to make possible the utilization of the current from the trolley for welding the bonds onto the rail with the smallest possible apparatus.

By the use of this outfit an electrically welded bond is obtained with a contact having an initial high conductivity and one which it is claimed will not depreciate on account of the elements, and the like. In obtaining this union between the bond and the rail, neither an arc nor a flame strikes the bond or rail, thus the danger of injury to the bond, rail and eyes is avoided. Instead, a heated block of graphite presses against the bond terminal and produces a weld in a way similar to that used with the present Erico bonding cars.

The apparatus is held in position for installing a bond by a yoke which sets over the head of the rail and a chain and hook fastened to the opposite rail. This holds it in a tilted position so that a part of its weight presses against the bond. Two hand wheels on the frame work are provided to adjust the tilt and vertical position of the furnace, so that the surface of the graphite will come into plane contact with the bond terminal.



ONE SCHEME OF MOUNTING PORTABLE APPARATUS

The process is as simple as the apparatus. The trolley circuit through the resistance and furnace to the rail is completed by closing the 200-amp. circuit breaker mounted in the center of the rheostat and controlled from the handle at the bottom. The regulation of the welding is obtained by adjusting the position of the electrode and by the use also of five points on the rheostat for this purpose. A current of from 60 to 125 amp. is used in making a weld, and a separate weld is made for each terminal of a bond, just as with the Erico bonding car. The time required per weld is about one minute. By use of the portable welder, it is claimed that a 500,000 or 600,000 circ. mil bond may be installed.

The rheostat contains approximately 4 ohms resistance, and its dimensions are 15 in. x 20 in. x 24 in. The furnace measures 6 in. x 8 in. x 8 in. The two pieces of the apparatus may be handled separately, or mounted on some such car as that shown in one of the accompanying illustrations. The rheostat is equipped with handles which are hinged so that they fall down out of the way when not in use. Handles are also provided on the four-wheeled larry shown and the whole apparatus can be lifted off the track by two men. When mounted on the larry, a furnace may be carried on either side, one for each rail, to save time in moving about.

This portable welder will operate with any voltage, it is claimed, from 150 to 600 volts, the variation being taken care of by means of the several taps off the rheostat. It meets the needs of the small road desiring welded bonds, as it avoids the expense of the heavy investment in the bonding car, and it also finds a special field of usefulness on the larger property on track where traffic is frequent and cannot be suspended.



PORTABLE ELECTRIC WELDER IN USE UNMOUNTED

London Letter

London Enters on Safety Campaign—Courses of Instruction in Safety Work Contemplated

(*From Our Regular Correspondent*)

A safety first campaign has been inaugurated in London. An important conference was convened by H. E. Blain, operating manager of the London General Omnibus Company, in order to discuss this question in relation to street traffic, and to devise some means of reducing the number of accidents, which since the introduction of restricted lighting have increased steadily. Representatives of forty-four local authorities in the metropolitan area attended, besides numerous other bodies and associations. In opening the proceedings, Mr. Blain stated that he was connected with companies which conveyed 971,000,000 passengers a year. In the first nine months of 1914, fatal street accidents in London amounted to 411, and that number had grown to 577 for the corresponding period of 1916. The street accidents of all descriptions in the latter period amounted to 34,575. By legends on omnibuses and advertisements displayed in railway stations, his company had endeavored to direct the attention of the public to safety first. As a result of the campaign among their own employees and the general public, the number of accidents in which the omnibuses of the company were involved had been reduced by no less than 25 per cent as compared with the previous year. In the letter convening the meeting, it was proposed that there should be:

1. Courses of instruction for traffic and transport employees.
2. The organization of street traffic with a view to greater public safety and efficiency.
3. The preparation of schemes with regard to street refugees, "safety" notices on lamps, etc., and for the education of the public, and to arrange effective publicity: (a) Through the press, (b) by poster advertisement, (c) by pictorial and other educational means for children, (d) by cinematograph films in picture theaters, (e) by a safety first exhibition to which the public would have free admission, etc.
4. The formation of an adequate organization to achieve these objects, and the creation of a fund for the purpose of providing the necessary income.

Co-operation Needed

Mr. Blain referred in turn to most of these suggestions, and gave reasons why each of them would help the cause. He stated, in conclusion, that financial contributions would not be required, but that co-operation was what was needed. The Mayor of Westminster afterward moved the first resolution:—"That this conference approves of the organization of a safety first campaign in the metropolitan area." This was seconded by W. Joynson-Hicks, M. P., chairman of the Automobile Association. The Mayor of Deptford moved: "That a London safety first campaign council be now elected, with power to co-opt additional members, to establish an adequate organization, and to take all necessary steps, by the appointment of committees and any other means to bring the scheme into prompt operation." H. Gordon Selfridge of Selfridge & Company, seconded this motion. Mr. Blain then suggested a basis for the council something on the following lines: Two representatives of each local authority, one a public representative and one an officer, a representative of each tramway and omnibus undertaking, a representative of each association, a representative of the railway companies having street goods vans, etc., a representative of the Metropolitan Police, a representative of the City of London Police, a representative of the motor cab industry, and several representatives of private firms. On the motion of the chairman of the Marylebone electric supply committee, it was agreed that the following should act as honorary secretaries pro tem of the new council: H. E. Blain, representing the traffic authorities; A. P. Johnson, town clerk of Hampstead, representing the civic authorities; and A. E. Cave, editor of *Municipal Journal*, representing publicity interests. In reply to a question, Mr. Blain said that the clerk of the London County Council had written that while the Council was in sympathy with the object in view, it felt diffidence as an executive body in sending representatives.

Avoidance of Accidents

Mr. Dalrymple, general manager of the Glasgow Corporation tramways, has addressed a memorandum to the members of the traffic staff, in which he makes a number of suggestions for the avoidance of accidents. He states that for some months he has been much concerned at the increasing number of accidents. Many of the staff are new to the service, while all are working under trying conditions. He is satisfied, however, that in many respects the staff could carry out their work with greater efficiency and with more satisfaction both to themselves and to the department. On both drivers and conductors he impresses the absolute necessity of taking greater care, and submits to them the following instructions: Do not, under any circumstances, run your car ahead of time. Do not run your car past stopping places when people are standing there. Do not start your car until you are absolutely certain that no one is entering or leaving. Do not ring the bell until every one is on or every one is off. Do not put your hand, when ringing the bell, in front of a passenger's face. Do not quarrel with passengers. Do not lose your temper with passengers, even under provocation. "So far as accidents are concerned," Mr. Dalrymple adds, "there are many circumstances conspiring against us at the present time. There is, of course, the inexperience of many of the staff. There is the overcrowding of cars. There is the darkening order. There is the boy in charge of the horse and cart. There is the general carelessness in the street, both on the part of pedestrians and of those in charge of vehicles. To the 'conductresses' I would say: 'Do not imagine that you know all your duties after being a week on the cars. Do not carry out your work as if you meant to leave the job to-morrow.' To the 'motresses' I would say: 'Go warily. Take plenty of time. Do not put on a notch of power until you know that the road is clear.' I should like to say to the women generally that in a short time we shall be losing more men. These men must go to fight for those who must stay at home. It is up to you to run the cars—indeed, to run the country. I should like every woman to enter the motor school."

Strike in Salford

Salford was recently without any tramway service for two days, owing to a strike of drivers and conductors against the employment of a number of women inspectors. After negotiations, however, the men accepted the tramways committee's suggestion that the matter in dispute be referred to arbitration by the committee on production, and that, pending the decision of the arbitrators, the women inspectors should be withdrawn from the cars. The men agreed to report for work and service was resumed.

The Nottinghamshire & Derbyshire Tramways has deposited a bill for introduction into Parliament next session for authority to take over the tramway undertaking of the Corporation of Ilkeston. The purchase price has been agreed at £28,150, which is to be paid by instalments on March 1 in each year, after the date of transfer, which has been fixed to date as from Sept. 30, 1916.

Lease Offer Accepted

The tramway committee of the Edinburgh Town Council has unanimously decided to recommend the town council to accept the offer of the lessees of the Edinburgh Tramways to sell the rolling stock, cables, and other plant to the corporation for £50,000. A sub-committee has been appointed to communicate with the Admiralty to ascertain whether there is present or prospective need for further transport facilities between Edinburgh and South Queensferry and Rosyth, and, if so, what these facilities should be, and what assistance might be available to the corporation in the event of facilities being provided.

The directors of the Dublin United Tramways (1896) have recommended the payment of a dividend of 6 per cent per annum, less tax, on the preference shares, and a final dividend of 5 per cent, less tax, on the ordinary shares for the half year ended Dec. 31, this being the same rate of distribution as at the corresponding period last year. The amount of £20,000 is set aside toward the renewal of rails, and £7,000 toward reserve and renewal fund. The sum of £13,359 is carried forward.

A. C. S.

News of Electric Railways

Financial and Corporate | Traffic and Transportation | Personal Mention | Construction News

Albany Company Upheld

Board of Arbitration Decides That the Case of Employee Discharged for Violation of Rules Was Adjudicated Fairly

That the case of Michael J. Hurley, motorman, was adjudicated fairly by officials of the United Traction Company, Albany, N. Y., and that Sec. 6 of the agreement between the company and its employees was not violated in handling the case, are the findings of the board of arbitrators which has been investigating the controversy that brought on the strike in Albany, Troy, Cohoes and Watervliet last October. The arbitrators were Lynn J. Arnold and William E. Woollard of Albany, and Mayor Cornelius F. Burns of Troy. They announced their decision on Jan. 25. In appended remarks, Judge Arnold and Judge Woollard also make this statement:

NO NECESSITY FOR STRIKE

"There was absolutely no necessity for a strike. The calling of the strike was unwise. It caused great inconvenience to the public. If the trivial differences could not have been settled by conferences between the parties directly interested they should have been settled by arbitration before calling a strike. Public service corporations and their employees must remember that they are not the only parties in interest. There is a third party to be considered, the public."

The findings as formally announced were:

"That Sec. 6 of the agreement between the parties was not violated in handling the case of Motorman Hurley.

"That the case of Motorman Hurley was adjudicated fairly by the officials of the company."

HISTORY OF CASE

The case was one involving the matter of discipline. All southbound interurban cars on the Albany-Troy line of the company are required by the company's regulations to come to a full stop (safety stop) at what is known as Garbrance Lane, a quiet well-traveled road crossing the tracks of the company and one "blind" to cars approaching from the north. For some time previous to Motorman Hurley's discharge the company had received a number of complaints of southbound cars running by this point without stopping as prescribed by the company's regulations, thus resulting in one automobile with three occupants being struck and the machine badly damaged. There were also numerous minor escapes. The situation became so bad that upon proof of Hurley's deliberate violation of the rule, he was discharged by the superintendent of transportation of the company. This led to the strike. While Mr. Burns, representing the employees on the board of arbitration, in his dissenting opinion contends that C. F. Hewitt, general manager of the company, acted in a summary manner in handling the Hurley case on appeal, Mr. Hewitt actually spent the afternoons of two days listening to the defence. As the arbitrators pointed out Hurley was actually discharged by the superintendent of transportation. His appearance before Mr. Hewitt in appeal was simply a review of the case.

The strike order went into effect in Albany early in the morning of Monday, Oct. 2. More than 800 men walked out and tied up all lines of the company in Albany and Rensselaer. Early the next morning, about 700 men employed on the lines in Troy joined in a sympathetic strike, tying up the lines in that city, Cohoes, Watervliet and Waterford. The arbitration agreement brought the strike to a settlement about noon on Wednesday, Oct. 4. The men returned to work as soon as cars could be prepared, and normal traffic was resumed about the middle of the afternoon.

$2,251,446 to Be Spent in Kansas City

This Sum Called for in the Budget of the Kansas City Railways for Track Extensions and Rehabilitation Work in 1917

The budget of the Kansas City (Mo.) Railways calls for the sum of $2,251,446 to be spent on track extensions and rehabilitation work in 1917. This sum will be apportioned as follows: way and structures, $1,303,146; equipment, $594,300; power, $354,000. The company plans the construction of 9.76 miles of extensions this year in Missouri, exclusive of special work of which there will be approximately 1 mile, bringing the total to 10.76 miles. This work, as planned, will cost $572,796.

In addition, the annual budget provides for $241,578 to be spent in rehabilitation work. This work is to be done on Tenth Street, Twenty-seventh Street, Prospect Avenue, Eighteenth Street, St. John Avenue, Belleview Avenue, Independence Avenue, Ninth Street, McGee Street, State Line, Forty-first Street, The Paseo extension, Swope Park and Hardesty Avenue.

Many renewals of special work are to be made at a total cost of $64,557, while it is planned to weld a total of 1610 joints by the electric welding process. The cost of this work will be $19,700. Welds will be made on Brooklyn Avenue, Twelfth Street, Fifteenth Street, Troost Avenue, Grand Avenue, Belleview Avenue, Ninth Street and Summit Street.

For general track repairs the sum of $143,722 is set aside. In this work, a total of 85,818 ft. of repair work is provided for on thirty-five streets.

Among the miscellaneous items provided for in the budget at a total cost of $89,700 are the following: Concrete covering on Main Street viaduct, $7,000; new asphalt plant, $21,000; two Indianapolis welders, $1,200; one concrete mixer, $2,000; track tools, $1,000 and rail not under contract, $57,500.

For general maintenance work, $185,000 is provided.

Toward the close of the year it is proposed to purchase twenty-five additional cars, the cost of which will approximate $150,000. It is also probable coasting clocks or recorders will be installed on the cars.

Progress on East Bay Franchises

Rapid progress is being made in aid of the efforts to accomplish a re-adjustment and re-settlement of the franchise relations of the San Francisco-Oakland Terminal Railways, Oakland, Cal., with the East Bay communities. Within the last few weeks the city of Alameda has adopted a charter containing re-settlement provisions, substantially similar to those of Oakland, which provide for an indeterminate grant as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 18, page 1071. The Board of Freeholders of Richmond has adopted the same provisions as are found in the Alameda charter, and the new charter of Richmond containing these provisions will be submitted to the electors for their approval in April. The amendments to the Oakland charter and to the charter of Berkeley have been introduced in both houses of the State Legislature, and early action is expected on them. Thus in a few months, amendments to the charters of Oakland, Berkeley, Alameda and Richmond have been proposed, in three instances have received the approval of the people, and may be expected to be ratified at this session of the Legislature. When this shall have been accomplished, these communities will be authorized by law to negotiate with the company for the surrender of its existing franchises and the acceptance by it of a re-settlement franchise.

Toledo Marking Time

Mr. Doherty Unable to Resume Franchise Negotiations for a While

Councilman Gus A. Hein introduced an ordinance in the Council of Toledo, Ohio, on Jan. 15, providing for the payment of rental for the use of the streets at the rate of $185 a day by the Toledo Railways & Light Company for the first year after its franchise expired, this amount to be increased 3 per cent each succeeding year. It further provides that the money thus received be placed in a special street improvement fund to be used to pave between the company's tracks, where pavements are repaired or new pavements are laid.

Because of the uncertainty in regard to a franchise, the company has refused to assume the expense of paving its right-of-way since the old franchise expired. Councilman Hein claims that it is now indebted to the city in the sum of $154,000 for paving and that the city cannot continue to advance funds for this purpose.

Henry L. Doherty, chairman of the board of the company, has notified the street railway commission that it will be some time before he will be able to resume work with it in formulating a new arrangement for the street railway. His other extensive utility interests demand his attention at the present time.

Pays Under Protest

Puget Sound Company Protests Gross Earnings Tax—City Moves to Enforce Franchise Provisions

The Puget Sound Traction, Light & Power Company, Seattle, Wash., recently offered $64,387, under protest, to the city of Seattle. This sum represents 2 per cent of the gross earnings of the company in 1916. The company stipulated that the payment is made only with the understanding that the city lives up to an agreement reached at a conference in 1915, by which the company was to pay a gross income tax under protest, and to plank rights-of-way, instead of paving them, pending a hearing of the Public Service Commission on a petition to be relieved of these franchise obligations. In the event that the city does not agree to this, and insists on instituting suit to require the company to pave its right-of-way, the tender of the gross earnings tax is to be withdrawn. The amount submitted represents a percentage on gross earnings of $2,900,831. As compared with 1915, the earnings of the company showed an increase of $140,875. Comparative figures of the 2 per cent gross income tax paid since 1912 follow: 1916 (amount offered under protest), $64,387; 1915, $51,581; 1914, $72,954; 1913, $71,724; 1912, $59,529. The matter of acceptance of the sum tendered was referred by the Council to the franchise and the finance committees, and was in turn referred to Hugh M. Caldwell, the Corporation Counsel, for an early report.

The city of Seattle will institute suit against the Puget Sound Traction, Light & Power Company to enforce that provision of the company's street railway franchise which requires the paving of right-of-way with the same material and at the same time the city paves the remainder of its streets. A. L. Valentine, superintendent of public utilities, recently recommended to the board of public works that certification be made to the legal department that the company has failed to pave First Avenue South, between Stacy and Horton Streets, and the recommendation was approved by the board. Since the company petitioned the Public Service Commission to be relieved of certain of its franchise obligations, it has refused to do other than to plank right-of-way until the commission disposes of its petition. Hugh M. Caldwell, corporation counsel, recently held that the company should be required to comply with its franchise obligations, until a competent court relieves it of such obligations. His announcement that he was ready to begin suit against the company to enforce its franchise obligations led to the designation of a particular street by the Board of Public Works, on which the litigation will be based.

Conference Asked in Minneapolis

President Lowry of Twin City Company Seeks to Discuss Valuation and Earnings with City

Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., has written to the special committee of the City Council on street railway matters and extensions requesting to be permitted to appear before the committee to discuss the questions of valuations and earnings of the Minneapolis Street Railway. His letter follows:

"In view of the evident misconception back of various statements relative to the valuation of the property of the Minneapolis Street Railway and its net earnings, we feel at the present time we should advise you of our desire to appear before your committee at a hearing to be held at an early date for the purpose of considering and discussing these matters with your committee.

"We do not expect the city to agree upon a valuation under the proposed franchise that will not from the very outset yield a substantial net surplus to be participated in by the city which should rapidly increase from year to year as the city grows and the street railway system is extended to meet such growth. This expectation is amply justified by recent operations of the company.

"We suggest that new lines and extensions of existing lines to be constructed in the immediate future should be considered as a whole, in order that such new lines and extensions should become a part of the best comprehensive transportation system for the city at large. We strongly recommend this plan for a specific program in dealing with a problem of such scope, believing that local interests will not suffer thereby and that the city as a whole will be greatly benefited.

"It is our desire to co-operate with your committee and other bodies, giving consideration to these questions and others involved in a new franchise, to the end that Minneapolis may be provided with a street railway system which will give the best possible public service."

Up to Jan. 20 no date had been set for a hearing.

On that date, however, the Council committee on street railway matters and extensions did decide to begin on Jan. 29 spending each afternoon of the week going over the route of the proposed street railway extensions. It was announced that before these inspections were begun there would be a conference between the chairman of the committee, the city attorney and city engineer and the head of the street railway so that the company's conception of what extensions are reasonable may be obtained and put before the committee.

Wages Adjusted on Lockport and Empire Lines

The question of wages for the employees of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., was opened at the request of the men that, effective Oct. 1, 1916, their contract be revised with reference to rates of pay to cover 35 cents an hour in passenger service and 36 cents an hour in freight service. After a series of conferences the company voluntarily granted an increase of 1 cent an hour in passenger and freight service, the increase to be effective as of Oct. 1, 1916, making the rate 31 cents an hour in passenger service and 35 cents an hour in freight service.

Under date of Dec. 23, the company and the representatives of the Brotherhood of Locomotive Engineers and Order of Railway Conductors, executed an agreement to arbitrate the matter of an additional increase of 1 cent an hour in both classes of service. On Jan. 8, 1917, the board of arbitration awarded the men an additional 1 cent an hour in passenger service, with no increase in freight service, making the rates of wages, retroactive to Oct. 1, 1916, 32 cents an hour in passenger service and 35 cents an hour in freight service. The wage scale as just noted applies also on the Empire United Railways, Inc., Syracuse, except that the increase, voluntarily and by award of the board of arbitration, is retroactive to May 1, 1916. These increases are according to agreement to remain in force and effect until May 1, 1917.

Cincinnati Agreement Discussed

The proposed agreement between the Cincinnati (Ohio) Traction Company and the city, providing for the operation of the municipal loop by the company, was discussed at a recent conference of members of the Rapid Transit Commission and a number of officials and business men. Both Walter A. Draper, vice-president of the company, and E. W. Edwards, chairman of the commission, agreed to do everything possible to reach an agreement, so that it may be submitted to a referendum vote at the regular election on April 17. Mr. Draper objected to fixing a 5-cent fare to points outside of the city, as complications would result if it should be decided in the future to extend the loop to distant suburbs. The Ohio Traction Company owns $2,000,000 of capital stock of the Cincinnati Traction Company and it was suggested that matters would be simplified by the consolidation of the companies. Mr. Draper said that the company would not profit through the construction of the loop, inasmuch as the possible patrons of the loop are already patrons of the company.

Cleveland Service Considered

Mayor Demands Better Service, but Insists That 3-Cent Fare Shall Continue

In an address before the Tippecanoe Club on the evening of Jan. 29, Mayor Harry L. Davis of Cleveland, Ohio, in announcing his candidacy for a second term, arraigned the Cleveland Railway for the character of service given for some time and declared that it must make an improvement or be refused a renewal of franchise in 1919. At the same time he insisted that the 3-cent fare be maintained.

President Stanley of the company had previously been quoted as saying a settlement of the operating and maintenance deficits would be demanded at an early date. The operating deficit is $195,075 and the maintenance overdraft or deficit, $268,918. On Jan. 1, 1917, the interest fund was $545,438. The scrapping of the Cedar Avenue power house will add $20,000 a month to the monthly payments to be made from the maintenance fund.

It is contended that 120 more cars would be needed in constant operation to carry the increased traffic without undue crowding. The city has supervision over this and could have made it possible to take care of the traffic. To do so, however, would have increased the operating expense and might have endangered the fare. Much complaint has been made in regard to crowded cars, but the company is unable to relieve the situation because of the control over service exercised by the city.

At the meeting of the City Council on Jan. 29 Fielder Sanders, street railway commissioner, asked that a $5,000,000 bond issue for a subway terminal for the street railway lines be submitted to the voters at the next election. He intimated that he would oppose the plan of having the Cleveland Railway build the terminal, but desires the company to operate it under lease after the city builds it.

COMMISSIONER SANDERS' VIEW

Mr. Sanders expressed the opinion recently that if the Cleveland Railway furnished the service the City Council is demanding just now, the fare would have to be advanced to the maximum allowed by the Tayler franchise. The Council had instructed Mr. Sanders to have traffic checked on several routes with the idea of demanding an improvement in the service and he gave expression to the opinion about fares in his reply. The increase in the traffic during the last year has been 10 per cent, whereas the normal increase is only 5 per cent. The company made arrangements for the latter increase, but the abnormal use of the cars has resulted in crowding. Mr. Sanders declared that the same conditions exist in other cities, particularly Boston and Philadelphia, which cities he visited recently.

Mr. Sanders put checkers at work on the St. Clair Avenue line on Jan. 22. Improvements in schedules have been made on the line two or three times within the last year, but the Council insisted on another investigation. Mr. Sanders was also instructed to revise schedules on the lines affected by the construction of the underground approaches to the Superior-Detroit bridge, in order that blockades caused by accidents and derailed cars may be avoided. Cars are operated over temporary tracks near the bridge on both sides of the river and some trouble has already been occasioned from this arrangement.

Strike Prevention Bill Introduced

A bill providing for State regulation of employment with a public service corporation was introduced on Feb. 1 by Assemblyman Schuyler M. Meyer of New York. The measure, according to Mr. Meyer, was drafted under the supervision of the New York Chamber of Commerce and has been indorsed by the Chamber of Commerce of the United States and the Merchants' Association. The original plan, as proposed by Henry R. Towne of the Merchants' Association, was described in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1916, page 692.

The bill provides that public service corporations and their employees must enter into reciprocal contracts of employment for a period of one to three years after a short period of probation, and that the corporations must not dismiss employees nor employees withdraw from service except for causes explicitly stated in the bill.

Under its provisions a public service corporation may dismiss an employee for misconduct defined in the bill as proper cause for discharge, for lack of employment due to slack business upon thirty days' notice, or in case of immediate discharge upon the payment of two weeks' salary; also for disability of the employee, with the proviso that when this is not due to negligence on his part he shall receive thirty days' wages on being dismissed. Discrimination because of membership in a labor organization is forbidden.

Employees may terminate their service for valid family reasons, personal necessity or disqualifying illness, certified by a board of award, or when no cause is given on thirty days' notice to the corporation and with its consent.

Hugh MacRae to Retire

Hugh MacRae, of Hugh MacRae & Company, Wilmington, N. C., president of the Tidewater Power Company, has concluded to dispose of his interest in the company. This decision is understood to have grown indirectly out of the situation which was created last July when the motormen and conductors of the power company went on strike. The men on returning to work signed an agreement to abide at all times by the decisions of a citizens' committee of 100 which pledged its support to Mr. MacRae. Mr. MacRae's opinion evidently is that the unqualified public support to which he felt himself entitled is lacking, for in a recent communication to the Council he said:

"For some time it has seemed clear to me that certain influences which are frequently brought to bear on individual members of every Council, and are often made to appear as expressing public sentiment, spring from sources which are antagonistic to me personally. In order, therefore, to remove as far as possible these obstacles and so that the way may be kept free for your co-operation with the company along lines that will bring the greatest good in the development of the community, I have concluded at some time in the near future to dispose of my interest in the Tidewater Power Company. It seems best to make the announcement at this time when the company is not under pressure from any direction, and everything as far as I know is harmonious. I would not care to arrive at a decision at any time when it would appear to be retiring under an attack."

In a letter to Rev. Thomas P. Noe, chairman of the committee of 100 which in July inquired into the affairs of the company, Mr. MacRae said in part:

"I appreciate most highly the findings of your committee, but personally I do not feel assured of the physical strength or the political influence necessary to carry out the different steps which would be essential to the protective program recommended by your committee.

"It is my belief that perhaps four-fifths of the citizens of Wilmington would fully concur in the report of your committee; but the other fifth would in opposition appear to be more active. I have decided that it would be best at some suitable time in the near future to dispose of my interests in the Tidewater Power Company, feeling that the policies which I hoped to carry out would not be wise ones under the present circumstances."

W. S. Barstow Management Association

The W. S. Barstow Management Association has been incorporated for the purpose of supervising the management of the subsidiary properties of the Eastern Power & Light Corporation and the General Gas & Electric Company. The directors of the new company are W. S. Barstow, J. B. Taylor, L. H. Tyng, E. Lovett West, O. Clement Swenson, E. M. Gilbert and Thomas Cheyne. A meeting of the association will be held shortly to organize and elect officers. This company will have managerial supervision over the following companies: Reading Transit & Light Company and Metropolitan Electric Company, Reading, Pa.; Pennsylvania Utilities Company, Eastern Pennsylvania Power Company and Easton Gas Works, Easton, Pa.; Binghamton Light, Heat & Power Company, Binghamton, N. Y.; Sayre (N. Y.) Electric Company; New Jersey Power & Light. Company, Dover, N. J.; Rutland Railway, Light & Power Company, Western Vermont Power & Light Company and Pittsford Power Company, Rutland, Vt.; Claremont Power Company, Claremont Railway & Lighting Company and Colonial Power Company, Claremont, N. H.; Sandusky Gas & Electric Company, Sandusky, Ohio; West Virginia Traction & Electric Company, City & Suburban Gas Company and City Railway, Wheeling, W. Va.; Northwestern Ohio Railway & Power Company, Port Clinton, Ohio; Vincennes Electric Company and City Lighting Company, Vincennes, Ind.

The combined annual gross earnings of the foregoing properties in 1916 were approximately $7,000,000. W. S. Barstow & Company, Inc., New York, N. Y., who have heretofore supervised the management of the subsidiary properties, will continue in general executive charge and also control their financial operations.

Strike at Hamilton.—Motormen and conductors on the local lines of the Ohio Electric Railway in Hamilton are out on a strike. New men have been employed and some of the cars have been kept in operation.

Eight-Hour Bill in Ohio.—Representative Henry Ott has introduced a bill in the Legislature of Ohio limiting the workday of motormen and conductors on both street and interurban railways to eight hours. A similar bill failed before the previous Legislature.

Fort Smith Fare Bill Killed.—The bill introduced in the Arkansas Legislature to regulate street car fares in Fort Smith and Van Buren has been killed by an adverse committee report in the Senate. The bill would have fixed a 5-cent fare for Fort Smith and Van Buren, with 100 tickets for $3.50. It was opposed by the company and the progressive citizens of Fort Smith and vicinity. In addition to fixing a 5-cent fare, the bill required two men as the crew on every car.

New Route into Cleveland.—It is reported that the Cleveland, Painesville & Eastern Railway will sign a contract with the Cleveland & Youngstown Railroad whereby cars of the former will enter Cleveland over the tracks of the Cleveland & Youngstown Railroad and use the new station that is to be built by the Van Sweringen interests. The connection between the roads will probably be made near South Euclid. This will open up an immense tract of land for allotment purposes.

New Rapid Transit Line to Open.—The Interborough Rapid Transit Company under direction of the Public Service Commission for the First District of New York began operation on the new Astoria rapid transit line at noon on Feb. 1. This line is a three-track elevated railroad extending from the Queensboro Bridge Plaza in Long Island City north to Ditmars Avenue, Astoria. Its opening affords relief to a district not now served by any rapid transit line. The new line is three track for its entire distance and express service will be provided in the morning and evening hours. The line has cost in round figures, including track installation and station finish, exclusive of equipment, $1,350,000.

I. C. C. Valuation Methods Criticised.—At a hearing in Washington on Jan. 29 on the findings of the Interstate Commerce Commission in the case of the valuation of the Atlanta, Birmingham & Atlantic and the Texas Midland Railways, counsel for the companies charged that the commission failed to obey the law in making valuations and failed to include a great many items which it should have included. Whether trackage rights of a railroad over connecting lines should be included, and, if so, at what figure, was one of the points debated, counsel for the Texas Midland asserting that 14 miles in the road's main line had been omitted because the road did not own the property outright but merely had leased trackage rights over this stretch.

Canadian Hydro-Radial Lines Approved.—Most of the municipalities along the Canadian shore of Lake Erie between Port Colborne and Bridgeburg, Ont., have approved the plan of guaranteeing bonds for a government-owned hydroelectric radial railway between these two points. Bridgeburg, Fort Erie and Port Colborne, the largest towns along the proposed route, have guaranteed more than $2,000,000 in bonds to pay for the cost of construction. The city of Hamilton, Ont., defeated the proposition for the proposed hydroelectric line between Toronto and the Niagara frontier, but Sir Adam Beck, of the Ontario Hydroelectric Commission, declares this defeat will not have a depressing effect upon the plan as construction work will not be started until after the end of the European war.

Niagara Power Situation Serious.—Owing to the serious shortage of electric power in western New York, due to the embargo placed by the Canadian Government on the exportation of Canadian-Niagara power to American consumers and increased demand for power from American-Niagara generating companies, the International Railway, Buffalo, N. Y., has been forced temporarily to suspend service over its Niagara Falls local lines for several hours a day during the last few weeks. On one occasion the company was without power to operate cars from 6 to 7.45 a. m., and from 3.20 to 5 p. m. The company is taking power from the Niagara Falls Power Company to operate its Niagara Falls local lines, and the Toronto & St. Catharines Railway is supplying power for the Park & River division between Chippawa and Queenstown, Ontario, along the Canadian gorge.

President McCulloch Joins St. Louis Advertising Club.—When Richard McCulloch, president and general manager of the United Railways, St. Louis, Mo., became a member of the Advertising Club of St. Louis recently he placed the company's physical equipment and men at the disposal of the advertising men for use in their night parade at the convention of the Associated Advertising Clubs of the World, which will be held in St. Louis in June. It is planned to make the parade surpass in magnitude and splendor anything ever attempted before in the United States. Many inquiries have been received from advertising clubs in other cities in regard to the parade. Details are now available, and the fact that those who exhibit will be able to have their floats lighted with electricity will provide an ample outlet for settings which could not be produced under other circumstances.

Programs of Association Meetings

New York Electric Railway Association

The quarterly meeting of the New York Electric Railway Association has been arranged for March 2 at the Hotel Astor, New York, N. Y. There will be a business meeting at 10.30 a. m. at the hotel and a dinner at the same place at 7.30 p. m.

New England Railroad Club

A review of steam railroad electrification history will be the feature of the next regular monthly meeting of the New England Railroad Club, which will be held at the Hotel Brunswick, Boston, Mass., on Feb. 13. The principal address will be delivered by Frank H. Shepard, special representative of the Westinghouse Electric & Manufacturing Company, after which moving pictures of the latest installations will be shown by Q. W. Hershey of the heavy traction department of the Westinghouse Company.

Financial and Corporate

Annual Report

British Columbia Electric Railway, Ltd.

The income statement of the British Columbia Electric Railway, Ltd., Vancouver, B. C., for the year ended June 30, 1916, follows:

Income	£258,206
Registration fees, etc.	195
Total	£258,401
Renewals—maintenance	£102,236
Directors' fees	998
Special remuneration to chairman's assistant	1,367
Office rent, salaries, etc.	5,306
Income tax provision	10,000
Trustees fees	874
Capital amortization fund	2,655
Total	£123,437
Balance	£134,964
Balance brought forward from previous year	6,666
Transfer from reserve fund	70,000
Total	£211,630
Interest on debentures and debenture stock	132,771
Balance	£78,859

The gross income of this company for the year ended June 30, 1916, was only £258,206, as compared with £370,000 for the preceding year and £560,000 for the year ended June 30, 1914—a decrease in the two years since the outbreak of war of more than 50 per cent. This was due mainly to two causes—namely, a reduction in the population of the districts served, owing to the extraordinary proportion of the manhood of the province voluntarily enlisted in the army, and the continuance of the unfair competition of jitneys.

About 35,000 soldiers left British Columbia for overseas service, of whom probably 25,000 were from the company's territory. A further large number of people more or less dependent on them also left, so that the population decreased by fully 30 per cent. It is deemed reasonable, however, to look for an increase in profits on the return of the troops almost as rapid as the decrease was. The stockholders will not get back all at once the dividend formerly received on the deferred ordinary stock, but it is felt that they should again receive a moderate return on the money invested in that stock within a year or two of the end of the war.

Although after Jan. 1 the competition from jitneys was less acute than in the previous year, these cars are still depriving the company of earnings amounting to approximately £70,000 a year. Another serious factor is the large increase in operating costs. During the last fiscal year the shortage of men and the increase in prices of commodities created a difficult situation. These conditions seriously affected the employees, and although the agreement with them still had a few months to run, it was decided to grant an immediate increase of wages. This concession involves an increase in working expenses of more than £20,000 per annum, and is to remain in force until June 30, 1918. During the last year capital expenditures fell off from £175,110 to £26,980.

A more agreeable side of the situation is the fact that during the four months of the current year there was an increase in net earnings over the same period last year of more than £30,000. The improvement commenced in February, and, although varying in amount, was continuous month by month up to and including October, which is the last return received. It is thought that there are grounds to hope that this increase in earnings may continue on a sufficiently large scale to enable the company this year to meet the dividend on the 5 per cent cumulative preference stock without having recourse to the reserve fund. This had to be drawn upon for £70,000 in the last year to permit the payment of £72,000 in dividends on such stock.

B. R. T. Taxes Up 45 Per Cent

Analysis of Six Months' Results Shows Higher Operating Costs, Taxes and Interest

At the annual meeting of stockholders of the Brooklyn (N. Y.) Rapid Transit Company on Jan. 26, President T. P. Williams made a statement explaining the unfavorable showing of the company for the first half of the present fiscal year. It is not customary for the company to submit a report at the annual meeting, but this time it was deemed desirable to acquaint the stockholders with the causes of the showing thus far made.

For the six months ended Dec. 31, 1916, the gross operating revenues of the system were $14,880,669, an increase of $832,224 (5.92 per cent) over the operating revenues of the same period of 1915. The operating expenses were $8,296,634, an increase of $580,024. Of this increase nearly $500,000 was in wages paid to transportation employees. The ratio of operating expenses to revenues was 55.75 per cent as compared with 54.93 per cent for the same period of the preceding year. The net revenue was $6,584,035, an increase of $252,200. Up to this point the comparison is not unfavorable, President Williams said, especially in view of the facts that the unit rate of wages was very materially increased, and that the prices of materials used in operation were also considerably higher.

After deducting taxes and interest, however, the surplus income for the system during these six months was $2,755,684, a falling off of $585,849 from the surplus income of the corresponding six months of 1915. In other words, although gross revenues during the period increased $832,224, the net result was $585,849 less income available for dividends. This showing was caused by the largely increased amounts charged to taxes and interest—taxes showing an increase of $391,206 (45.72 per cent), and interest showing a net increase of $441,312. Notwithstanding these additional burdens the system's net income available for dividends was more than $500,000 in excess of the dividend requirements, at the rate of 6 per cent per annum, for this period.

It is reasonable to suppose, President Williams stated, that the operations for the remaining six months of the fiscal year will make a better relative showing. Part of the increase in wages became effective on Jan. 1, 1916, and appeared in last year's figures. Part of the increased taxes began to be absorbed in March of last year. Additional interest charges (substantially at the present rate) became effective in January a year ago, and are not likely to be materially increased during the current six months. Therefore, if the passenger earnings continue to increase at the present rate, the system ought to show for the final six months of this fiscal year as good results, if not better, than those for the same period of 1916.

What Caused Lower Net Income

In discussing the factors in the showing for the last six months, President Williams continued as follows:

"There will be, I am sure, no dissent among stockholders as to the wisdom or justice of materially increasing the wages of employees. The company has long adhered to the policy of sharing its prosperity with its workers, and the advantage of that policy was conspicuously demonstrated last summer, when our men remained loyal to their work while the employees of practically all the other street railways in Greater New York were disaffected or went on strikes.

"In the matter of taxation, we in common with other property owners and corporations are paying the penalties of increasing expenditures for the support of government. When new taxes are to be levied the first victim is likely to be the public service corporation, notwithstanding the conceded fact that every additional burden thus imposed limits and restricts the ability of the corporation to render public service. By way of increased assessments and new laws, our taxes for the year have been increased nearly $600,000, and they are to-day about 30 per cent of our income remaining after paying operating expenses, rentals and interest.

"The increase in interest charges is due to new rapid

transit properties placed in operation under our recent contracts with the city. Less than one-third of the expenditures which we are required to make under those contracts represents properties yet in operation, and these properties are regarded as the least productive of the new lines. The results of this partial operation, however, have been particularly gratifying. During the six months ended Dec. 31, 1916, the passenger receipts of the New York Consolidated Railroad (the constituent company which operates the rapid transit railroads under contracts with the city) have increased more than 17 per cent, and the indications are that the preliminary estimates of earning capacity will be more than realized when the entire new rapid transit system is in operation. The Broadway-Manhattan subway will, it is likely, be ready for operation during the current year and ought to be distinctly helpful."

Strickland Lines Consolidate

Texas Traction Company and the Southern Traction Company Unite as the Texas Electric Railway

The consolidation of the Texas Traction Company and the Southern Traction Company, Dallas, as the Texas Electric Railway was voted unanimously at a meeting in Dallas on Jan. 31. J. F. Strickland has been elected president of the Texas Electric Railway. There were represented at the meeting 26,820 out of 30,000 shares of stock of the Texas Traction Company and 67,298 out of 70,000 shares of stock of the Southern Traction Company. Final details of the consolidation will be worked out at a meeting in Chicago during the week beginning Feb. 5.

The Texas Electric Railway was chartered in Texas in July, 1916, with a capital stock of $10,500,000, and at the meetings of the stockholders of the Southern Traction Company and the Texas Traction Company held in Dallas on July 18 action of the directors of the company in arranging for the consolidation under the name of the Texas Electric Railway was formally ratified. Circumstances over which the participating companies had no control prevented the carrying out of the deal at that time. It is now reported unofficially that the consolidation just ratified has as its basis substantially the same terms and conditions as the proposed consolidation of last July, which was noted in the ELECTRIC RAILWAY JOURNAL for July 29, 1916.

Atlanta Financing Approved

Two of the Three Petitions of the Affiliated Atlanta Companies Allowed—The Other Under Advisement

The Georgia Railroad Commission on Jan. 24 approved the $459,000 bond issue petitioned by the Georgia Railway & Power Company and the $283,000 bond issue asked by the Georgia Railway & Electric Company. The commission did not act upon the petition of the Georgia Railway & Power Company asking permission to issue $420,000 in scrip or non-interest-bearing notes to pay accumulated dividends upon its first preferred stock. The commission is investigating questions of law and public policy in connection with this petition, and is not expected to announce any decision before the next meeting of the commission, which will be held on Feb. 13.

The petition of the Georgia Railway & Power Company approved by the commission authorizes that company to issue $459,000 par value of first and refunding bonds for the reimbursement of the treasury for funds spent in the period from Jan. 1 to Oct. 31, 1916, for extensions and purchase of new property. These bonds are a part of an issue of $30,000,000 that was approved by the commission in 1914. The expenditures which the present issue is to meet, cover the extension of power lines, the purchase of hydroelectric sites and similar disbursements within the State of Georgia and outside the 7-mile limit of the city of Atlanta.

The petition of the Georgia Railway & Electric Company, which is leased by the Georgia Railway & Power Company, approved by the commission, authorizes that company to issue $283,000 par value of refunding and improvement forty-five-year 5 per cent bonds under a mortgage approved by the commission in 1909. This amount is to reimburse the treasury of the company for money that the company expended for extensions and improvements within the 7-mile limit of the city of Atlanta during the period from Jan. 1 to Oct. 31, 1916.

The original applications of the companies to the commission were referred to at length in the ELECTRIC RAILWAY JOURNAL of Jan. 13, page 92.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—The Supreme Court of Alabama has decided that the Alabama Public Service Commission was within its jurisdiction in ruling that the merger of the Birmingham Railway, Light & Power Company and the Birmingham, Ensley & Bessemer Railroad was consistent with the public interest. The decision is in effect that the Brown bill authorizing the Public Service Commission to approve mergers when consistent with the public interest was constitutional and that the action by the commission in this case was within the provisions of that bill. The commission in the fall of 1916 authorized the substitution of the Birmingham-Tidewater Railway, the entire capital stock of which is owned by the Birmingham Railway, Light & Power Company, for J. D. Kirkpatrick as purchaser of the Birmingham, Ensley & Bessemer Railroad at foreclosure sale. References to the sale of the property under foreclosure and to the subsequent negotiations for turning it over to the Birmingham Railway, Light & Power Company were contained in the ELECTRIC RAILWAY JOURNAL for Jan. 15, April 1 and 8, and Sept. 9, 1916.

Chicago (Ill.) Railways.—Chairman Henry A. Blair of the Chicago Railways has reported to the bankers' syndicate purchasing $1,700,000 of the company's first mortgage bonds that for the twelve months ended Nov. 30, 1916, gross revenues showed a gain of $2,917,148 or 9.2 per cent, while there was an increase in net revenues of $1,555,183 or 14.4 per cent over the twelve months ended Nov. 30, 1915.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—The Public Service Commission of Illinois has authorized the Chicago, North Shore & Milwaukee Railroad to issue $170,000 of equipment gold notes, the proceeds to be used for the purchase of fifteen steel cars.

Columbus Railway, Power & Light Company, Columbus, Ohio.—At the annual meeting of the stockholders of the Columbus Railway, Power & Light Company on Jan. 23, it was decided to increase the number of directors from eleven to fifteen. Norman McD. Crawford of the E. W. Clark Management Corporation was chosen as a member of the board. He has been a vice-president of the company since November, 1916, and will act as president of the company during the absence of President McMeen in California on sick leave.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—Eli M. West, receiver of the Columbus, Delaware & Marion Railway, has been ordered by the court not to pay interest on the second mortgage bonds of the company, due on Feb. 1, the interest totaling $23,000. This action was taken in line with a motion by holders of the first mortgage bonds, on which interest was defaulted last November, that no interest be paid on the second mortgage bonds. There are $920,000 of the second mortgage bonds outstanding, and the holders of these are now expected to ask foreclosure and wind up the receivership, which has been in existence for eight years.

Jacksonville (Fla.) Traction Company.—The directors of the Jacksonville Traction Company at their meeting on Jan. 15 did not declare the dividend on the $500,000 of 6 per cent cumulative preferred stock normally payable on Feb. 1. Last August only three-quarters of 1 per cent was paid. According to an official statement the earnings of the company have shown some improvement during the last few weeks, but in the opinion of the board conditions did not warrant any dividend at this time. It is explained that the prosperity of the city depends largely on the export business, which, due to the high rates of shipping brought about by the war, has as yet failed to show substantial improvement. Every effort has been made to reduce the operating expenses without curtailing service or proper

maintenance. It is pointed out that Jacksonville is an important wholesale distributing center, and that a return to normal conditions should improve the earnings of the company.

Middle West Utilities Company, Chicago, Ill.—The Middle West Utilities Company has declared an initial quarterly dividend of one-half of 1 per cent in cash and a semi-annual dividend of 1 per cent in common stock on its common stock, both payable on April 2 to stock of record of March 15. In announcing the dividend policy of the company, Mr. Insull said: "The Middle West Utilities Company is growing rapidly, and the character of its business is such that large amounts of new capital are required, all of which is employed at a return far greater than 4 per cent a year. It has been calculated that a portion of the surplus earnings invested in the property and represented by the common stock dividends, will accomplish the twofold object of lessening the requirements of outside capital, and greatly strengthening the equity behind the company's senior securities and the standing thereof. From the viewpoint of the common stockholder surplus earnings so invested will earn him a larger return than would be prudent to pay in cash for a long time to come. With these objects in view, the board of directors has inaugurated this dividend policy, and naturally expects, from time to time, to disburse larger dividends in common stock as the increase in earnings and surplus may justify."

Muscatine, Burlington & Southern Railroad, Davenport, Iowa.—The report has been revived that the United Light & Railways Company is considering the purchase of the Muscatine, Burlington & Southern Railroad, formerly the Muscatine North & South Railway, a steam road between Muscatine and Burlington. In April, 1916, officials of the Tri-City Railway & Light Company, which is controlled by the United Light & Railways Company, were approached by officials of the Muscatine North & South Railway relative to the question of power. R. J. Denman, an officer of both the Tri-City Railway & Light Company and the United Light & Railways Company, inquired into the power matter, but stated then that there was not the slightest possibility of the United Light & Railways Company taking over the property.

New York State Railways, New York, N. Y.—The New York Stock Exchange has listed $6,532,000 of additional fifty-three-year consolidated mortgage 4½ per cent bonds of the New York State Railways, series A, due on Nov. 1, 1962, making the total listed $13,457,000, of which $12,748,000 were outstanding on Dec. 31, 1915. The additional bonds represent expenditures for additions, betterments, etc., including $3,075,000 yet to be made.

Okmulgee (Okla.) Interurban Railway.—An option for the purchase of the Okmulgee Interurban Railway has been sold by the Lambert interests to O. R. B. Pace, Sherman, Tex.; C. F. Hopkins, of the Union National Bank, Tulsa, Okla., and C. W. Goree, Okmulgee. The purchasers of the option announce that the line is to be made the nucleus of an interurban system which will reach Tulsa and Oklahoma City. Lake Park is also included in the option.

Orleans-Kenner Electric Railway, New Orleans, La.—The city of New Orleans is said to have under consideration the question of conducting negotiations for the purchase of the Orleans-Kenner Electric Railway. Practically all the line is outside the city, but the road is desired as an annex to the public belt system. I. D. Moore, city attorney, is said to have rendered an opinion to the effect that the Public Belt Commission would be within its rights in acting in the matter.

Pacific Gas & Electric Company, Sacramento, Cal.—The National City Company and Harris, Forbes & Company, New York, N. Y., are offering for subscription $3,060,000 of general and refunding mortgage 5 per cent gold bonds of the Pacific Gas & Electric Company dated Dec. 1, 1911, and due on Jan. 1, 1942.

Portland & Oregon City Railway, Portland, Ore.—There has been filed for record in favor of the Security Savings & Trust Company, Portland, as trustee, a deed securing an issue of $350,000 of bonds by the Portland & Oregon City Railway, the proceeds to be used to extend the railway from Dedham station to Oregon City.

Rochester Railway & Light Company, Rochester, N. Y.—The merger of the Canandaigua Gas Light Company, the Despatch Heat, Light & Power Company, the Eastern Monroe Electric Light & Gas Company, and all but the electric railroad property of the Ontario Light & Traction Company into the Rochester Railway & Light Company, has been approved and payment partly provided for through an issue of securities by the last-named company in an order of the Public Service Commission at Albany. The Rochester Railway & Light Company is authorized to issue $750,000 of its common stock at par, which the Mohawk Valley Company is authorized to purchase. The proceeds of the sale will be used by the Rochester company to pay $50,000 for the outstanding stock of the Canandaigua company, $400,000 for the outstanding stock of the Despatch company and $250,000 for that of the Eastern Monroe company. For the property and franchises other than the electric railroad of the Ontario Light & Traction Company, the Rochester company will pay $178,500. Upon the merger of the three companies their stock will be cancelled.

Seattle (Wash.) Municipal Railway.—According to the report of A. L. Valentine, superintendent of public utilities, the municipal lines of Seattle, Division "A" and Division "C," were operated during December, 1916, at a loss of $2,393. During the entire year of 1916, according to Mr. Valentine's report, the lines were operated at a total loss of $29,417. During May and June both Division "A" and Division "C" were operated at a profit more than sufficient to pay the operating cost, but not sufficient to cover the interest. In all other months the revenues were not sufficient to cover the operating cost. The city of Seattle began the operation of the municipal lines on June 1, 1914, and for the remainder of that year there was a loss of $14,580. The loss in 1915 was $41,389. The total loss for the two and one-half years has accordingly been $85,387.

St. Lawrence International Electric Railroad & Land Company, Alexandria Bay, N. Y.—The St. Lawrence International Electric Railroad & Land Company is defunct. On Aug. 5, 1916, the Northern New York Utilities, Inc., acquired the lighting property for $40,000 at mortgage foreclosure sale, obtaining a deed on Aug. 16, 1916. At the same time the railroad property was acquired by Hurwitz Brothers Iron & Metal Company, Syracuse, N. Y., who operated it until Oct. 16, 1916, after which operations were discontinued because of the failure to secure sufficient subscribers for the organization of a new company to continue the railroad operations. The property has been dismantled and scrapped.

United Railways & Electric Company, Baltimore, Md.—At the meeting of the directors of the United Railways & Electric Company on Jan. 30 M. Ernest Jenkins was elected a member of the executive committee. He takes the place of William A. House, resigned.

Washington Railway & Electric Company, Washington, D. C.—At the recent annual meeting of the Washington Railway & Electric Company Charles A. Spalding, Washington, was elected a director of the company to succeed Oscar L. Gubelman, of Knauth, Nachod & Kuhne, New York, N. Y., bankers, who retired because his other interests prevented him from participating regularly in the deliberations of the board.

Washington & Maryland Railway, Washington, D. C.—The Public Utilities Commission of the District of Columbia has withdrawn the authority granted under its order dated June 30, 1915, authorizing the Washington & Maryland Railway to issue and sell first-mortgage 5 per cent thirty-year gold bonds to the amount of $66,200. It has now authorized the company to issue $66,000, par value, of general mortgage 6 per cent thirty-year gold bonds and $30,000, par value, of prior lien 5½ per cent thirty-year gold bonds. The $66,000, par value, of the general mortgage bonds of the railway will be used to consummate the purchase of the properties of the Baltimore & Washington Transit Company in Maryland in lieu of the $66,200, par value, general mortgage bonds heretofore authorized, including the retiring of the certificates issued by the receiver of the Baltimore & Washington Transit Company of Maryland, amounting to $20,000. The $30,000, par value, of prior lien, 5½ per cent, thirty-year gold bonds will be used as collateral to secure the payment of $25,000 of 6 per

cent, one-year gold notes. The $25,000, par value, 6 per cent, one-year gold notes will be sold for cash at par, and the proceeds will be used to extend the road from its present terminus in the town of Takoma Park, Montgomery County, Maryland, and through the town by way of Carroll Avenue to its junction with Sligo Creek. As the gold notes which are to be issued are payable in not more than a year the consent of the commission was not necessary on this point and the commission did not consider it. The commission also approved a contract providing for the operation of the lines of the Washington & Maryland Railway by the Capitol Traction Company.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1½ per cent, preferred.

Illinois Traction Company, Peoria, Ill., quarterly, three-quarters of 1 per cent, common.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1⅜ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, preferred.

Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, 2½ per cent, common.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

United Power & Transportation Company, Camden, N. J., $1.55.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec.,		'16	$21,935	*$33,520	†$11,585	.....	.....
1 " "		'15	22,658	*20,051	2,607	.....	.....
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.							
1m., Nov.,		'16	$34,904	*$19,084	$15,820	$6,484	$9,336
1 " "		'15	33,011	*17,790	15,221	6,642	8 579
12 " "		'16	389 650	*228,545	161,105	78,212	82,793
12 " "		'15	350,740	*205,580	145,160	79,330	65,830
COLUMBUS (GA.) ELECTRIC COMPANY							
1m., Nov.,		'16	$87,021	*$31,903	$55,118	$28,521	$26,597
1 " "		'15	67,290	*27,382	39 908	28,679	11,229
12 " "		'16	867,196	*347,933	519,263	343,726	175,537
12 " "		'15	710,927	*322,776	388,151	344,657	43,494
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.							
1m., Dec.,		'16	$230,174	*$133,385	$96,789	$49,795	$46,994
1 " "		'15	229,556	*145,642	83,914	48,493	35,421
12 " "		'16	2 502,142	*1,637,893	864,249	586,046	278,203
12 " "		'15	2,352,015	*1,545,716	806,299	589,342	216,957
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.							
1m., Nov.,		'16	$61,871	*$47,460	$14 411	$15,246	†$835
1 " "		'15	57,229	*40.667	16,562	15,959	603
12 " "		'16	798,318	*543.474	254.844	188,312	66,532
12 " "		'15	729,994	*473,190	256,804	189,531	67,273
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.							
1m., Nov.,		'16	$163,929	*$92,228	$71,701	$29,222	$42,479
1 " "		'15	145,691	*89 000	56,691	26,954	29,737
12 " "		'16	1,904,904	*1,149.770	755,134	347,583	407,551
12 " "		'15	1,718,833	*1,043,340	675,493	330,265	345,228
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.							
1m., Nov.,		'16	$26,100	*$19,883	$6,217	$7,246	†$1 029
1 " "		'15	25,031	*14.421	10,610	7,476	3,134
12 " "		'16	311,625	*208,633	102,992	86 845	16,147
12 " "		'15	289,671	*179,861	109,810	91,529	18,281
PENSACOLA (FLA.) ELECTRIC COMPANY							
1m., Nov.,		'16	$21,151	*$13,698	$7,453	$7,726	†$273
1 " "		'15	23,516	*12,407	11,109	7,051	4,058
12 " "		'16	277,192	*155,688	121,504	91,894	29,610
12 " "		'15	254,213	*146,419	107,794	86,073	21,721
TAMPA (FLA.) ELECTRIC COMPANY							
1m., Nov.,		'16	$80 779	*$44,027	$36,752	$4,464	$32,288
1 " "		'15	83,696	*44,565	39,131	4.342	34,789
12 " "		'16	961,411	*526,540	434,871	42,391	382,480
12 " "		'15	980,780	*500,902	479.878	52,424	427,454

*Includes taxes. †Deficit.

Traffic and Transportation

British Steam Fares Up 50 Per Cent

Effort Made to Decrease Passenger Traffic and Allow Carriers to Meet Government Demands—Traffic Thrown on Tramways

The extent to which railroad service in Great Britain has been turned to government use was indicated in an unusual fashion by a recent act of the Board of Trade designed to cut down passenger traffic and thus allow the railroads to cope with government demands. It was announced that on and after Jan. 1, 1917, the railroads in Great Britain should take the following steps: (1) Increase all passenger fares 50 per cent, and (2) refuse to carry baggage exceeding a total weight of 100 lb. per passenger. It was intended that these orders should be applied generally, although certain exceptions would be publicly announced later. In general, however, the increase in fares was not to apply to (*a*) workmen's tickets, (*b*) season tickets, (*c*) traders' tickets and (*d*) zone tickets when an arrangement for the issuance of such tickets was already in operation.

When this increase in fares was first announced, some question was raised as to whether the parliamentary railroad fare of one penny a mile could be increased without special legislation. It was stated, however, that the defense of the realm act provided the Board of Trade with necessary power. Furthermore, it was said that the object of the government in making the increase was not to increase revenue, but solely to reduce passenger traffic in view of the enormous demands which the War Office and the Ministry of Munitions would make next year both in Great Britain and in France. The new order was fully a war measure, and the old fares would be restored after the cessation of hostility. It was officially announced, however, that the public would do well to understand that if the increase in fares and the new restrictions did not produce the desired result, other and more exacting measures would certainly be introduced.

The ordered increase applies in the main only to the steam railroads and not to municipal and other local tramways. The desire not to interfere with purely local transportation rates is evident in the published exception of the Underground Electric Railways of London, Ltd. The fare increase does not apply to this company within these limits: (1) On the District Railway within Aston Town, Putney Bridge and Bow Road; (2) on the Bakerloo, Piccadilly & Hampstead lines of the London Electric Railway; (3) on the Central London Railway; (4) on the City & South London Railway; (5) on the Inner Circle and stations on the Hammersmith & City line, and (6) on the Great Northern & City Railway. Local and through fares between these groups and within the limits stated remain unaltered, but in case of bookings to and from outside points, 50 per cent of the fare is added.

The immediate result of the fare increase on the steam railroads was a withdrawal of service that had an effect upon local tramway systems. The steam railroads largely curtailed their suburban train services and entirely shut down many of the stations in the suburban area. This applied very largely to London, but all other big cities were affected, though not so seriously. Consequently, more traffic is likely to be thrown on tramway services. It is anticipated that the closing of a large number of stations on the London railways will throw a considerable amount of extra traffic upon the London County Council Tramway. As soon as it is known where the extra traffic will fall, the tramways department of the Council will immediately consider the best ways and means of coping with it. It will be a difficult problem in view of the fact that the system is already fully taxed, but it is hoped that some solution may be found by a rearrangement of the service. The Underground Electric Railways have also got the matter under consideration, but no decision has yet been announced.

Jitney Tariffs Demanded

California Railroad Commission Requires Rates and Time Schedules Before March 1

The Railroad Commission of California on Jan. 19 ordered all passenger and freight jitneys and auto buses running on regular schedules over regular routes on public highways between fixed points, not solely within municipalities, to file their rates and time schedules with the commission before March 1, 1917. This order follows the recent decision of the Supreme Court of California that jitneys and auto buses operating under those conditions are subject to the jurisdiction of the commission. The commission has prepared blank forms for these filings of rates and routes, and will furnish them to jitney operators.

At present the status of the Railroad Commission with relation to jitneys, both passenger and freight, is that the commission has jurisdiction over the rates of all such transportation when not conducted solely within municipalities.

It was on the complaint of the Western Association of Short Line Railroads against the Wichita Transportation Company and of the United Railroads, San Francisco, against the Peninsula Rapid Transit Company that the proceeding was brought before the Railroad Commission, which recently resulted in the decision of the Supreme Court of California declaring that these lines were under the Railroad Commission's jurisdiction. The Western Association and the United Railroads asked the Railroad Commission to fix rates and time schedules for these freight and passenger jitneys, but the commission denied that it had jurisdiction over them. The case was taken to the Supreme Court by the complainant railroads, and the court decided that the commission had jurisdiction under the following conditions over both passenger and freight jitneys: (1) As common carriers of passengers or freight; (2) on regular schedules; (3) over regular routes on public highways and between fixed terminals, and not operating solely within the limits of one municipality.

These jitneys were held to be transportation companies under section 22 of Article 12 of the state constitution. The Supreme Court declined to say, however, that these companies were subject to all the provisions of the Public Utilities Act, which, besides giving the Railroad Commission jurisdiction over rates and rules of all public utilities, makes all issues of securities by these utilities subject to the commission, and requires that these companies obtain from the commission a certificate that public convenience and necessity require their operation before beginning business.

Hearing on Inclosed Vestibules

Commission Holds Hearing on Proposed Order to Require Fully Inclosed Vestibules on All Greater New York Cars

At a hearing on Jan. 31 the Public Service Commission of New York, First District, submitted its case in regard to a proposed order requiring fully-inclosed vestibules on all cars operated in Greater New York. At the opening of the hearing C. W. Wilder, electrical engineer for the commission, read a report outlining the results to be expected from the use of folding doors and steps in connection with door-interlocked control, citing the fact that the Third Avenue system had reduced the number of its boarding and alighting accidents by about 70 per cent by this means and had eliminated all serious accidents of this class. He quoted from a table published in the Electric Railway Journal for Feb. 6, 1915, in which it was shown that, on the Third Avenue Railway, the settlements for boarding accidents had been reduced from $6,817 to $451 during four months' test periods in successive years before and after installation of folding doors and steps, and that alighting accident settlements had been reduced from $5,667 to $1,110, these savings applying to about 210 cars.

Mr. Wilder regarded the change as a very profitable one for the railways from a purely financial standpoint, and said that the cost per car should range from $150 to $600 depending upon the amount of reconstruction that was necessary. With regard to the effect on schedule speed he stated that, with the door and control interlock, no appreciable difference need be expected. He did not recommend, however, a device to hold the door closed while the car was in motion, but only one that prevented power from being applied when the door was open.

Objection to the use of the interlock was raised by the railway's representatives on various grounds, including the fact that the device did not eliminate the human element in connection with alighting accidents. The commission, however, pointed out that boarding accidents appeared to be about twice as frequent as alighting accidents and that the serious alighting accidents had been eliminated by the use of folding doors on the Third Avenue System.

Emphasis was laid upon the fact, also, that the electric interlock was a patented device, although the commissioners treated this phase of the matter as of secondary importance by citing the general use of the patented air brake. However, the commission expressed evidence of being willing to accept equivalent devices, such as a mechanical means for holding the controller in off position. Other than this, attention centered throughout the questioning of Mr. Wilder on the matter of cost in relation to the possible saving in damage claims, and the fact was brought out that on one very small property in Greater New York no boarding and alighting accidents had occurred in ten years.

E. A. Maher, Jr., assistant general manager of the Third Avenue Railway, testified that all of that company's cars had been equipped with fully-inclosed vestibules since 1914, and that it was unquestionably a desirable arrangement. The interlock, he said, added about $100 to the cost of the change-over for each car, but that no royalty was paid to the patentee of the device, J. S. MacWhirter, superintendent of equipment, Third Avenue Railway. The total cost of material and labor for installing folding doors and steps and a control interlock amounted to $324 per car in 1913-14. At present prices the cost would be about 70 per cent greater.

No case was put forward by the railways at this hearing and more time was requested to permit them to investigate the subject. The hearing was therefore adjourned to Feb. 28.

Goods Traffic Recommended

Larger Electric Railway Freight Service Recommended by Massachusetts Cost of Living Commission

The extension of electric railway freight and express service at Boston and the development of comprehensive plans and the construction of appropriate facilities for the larger treatment of the merchandise transportation problem by the Boston Transit Commission is recommended in a special report to Governor McCall of Massachusetts by a special commission on the high cost of living, headed by former Lieut.-Gov. Robert Luce. In the course of its discussion the report emphasizes the admirable development of passenger transportation facilities at Boston in the last twenty-five years through the construction of subways by the commission and urges that the board now be required to devote its experience and abilities to the solution of the merchandise-handling problem. The report declares that electric railway freight has been neglected by the community as a factor in reducing the present high cost of living, points out that the existing electric railway express development is insufficient for the possible traffic available, and recommends that the details of electric freight service with the exception of terminal construction be placed under the supervision of the Public Service Commission. The report also advises legislation giving the latter commission power to authorize and foster, with due regard for public convenience, the carriage on electric railways of any and every form of merchandise and material.

Economy in Supplies Urged

Samuel Rea, president of the Pennsylvania Railroad, on Jan. 29 sent a notice to all officers and employees of the company calling attention to the fact that the strictest economy must be adhered to in the ordering and use of material. Mr. Rea's notice was as follows:

"I desire to call your attention to the exceptionally high

prices of all classes of materials and supplies. This increase in cost, in many cases exceeding 100 per cent and in some cases 200 per cent or higher, is becoming more serious for the company, and is one of the main causes for its decreased net earnings despite greater gross earnings. Therefore, in the interest of all concerned, it is essential to practise the strictest economy in ordering and using materials and supplies. Officers will bring this notice to the attention of all employees, and request their co-operation in all measures required to make it effective."

Jitney Regulations in Vancouver

The by-law embodying the changes in rules and regulations of jitney buses in Vancouver, B. C., has been passed by the Council after several months' delay. The only change made in the new ordinance on final reading was in the clause providing for the routing of jitneys. The routes finally decided upon are, with one exception, the same as those taken by the street cars. The new ordinance includes provisions that no person under twenty-one years of age shall operate a jitney; that all applicants must undergo a medical examination; that every owner of any motor vehicle must report to the license inspector once a month a record of all drivers in his employ; that only one passenger be allowed in the front seat; that cars must stop 75 ft. from a corner to load or unload passengers; that drivers must state the route over which they intend to operate when they secure license and must complete full trip; that lights must be kept burning in the rear seat of each car from dusk until dawn when the top is up; that the license fee per car shall be $30 and the driver's license $5 per annum. Representatives of the British Columbia Electric Railway and the Jitney League were present at the final hearing. W. G. Murrin, assistant general manager, spoke for the railway.

New Public Service Magazine

A new monthly employees' publication, the *Trolley Weal*, has just been launched into print by the Public Service Railway, Newark, N. J. The first issue, dated Januuary, 1917, is prefaced by forewords of encouragement by President Thomas N. McCarter and General Superintendent N. W. Bolen, expressing sympathy with the plan of starting the new magazine. The editor, J. W. Brown, assistant general superintendent of the company, is assisted by eight associate editors. The editorial plan, as announced in the columns of the new paper, provides for the publication from time to time of articles by the several department heads dealing with some special feature of operation, engineering, maintenance, accounting, or whatever the subject may be. In addition, every man is urged to contribute articles dealing with his experience in whatever duties he is engaged on the property, also to turn in items of personal and social nature of events in the athletic field and other general news. The periodical will in later issues keep its readers posted on technical literature by giving short reviews of new books received by the company's technical library and calling attention to the important articles in current periodicals. The magazine carries no advertising matter.

Ticket Sales on Cars Discontinued

The sale of interurban tickets on cars on the Akron, Bedford & Cleveland and Canton-Akron divisions of the Northern Ohio Traction & Light Company, Akron, Ohio, have been discontinued. According to the company it has been found that conductors were very often unable to supply tickets to all who requested them without being required to carry an excessive and impracticable number of tickets on the cars; and these tickets sold on cars could not be accurately stamped as to dates and place excepting only from the offices where conductors obtained supplies. As a result, the record of the date of the ticket might be all wrong by the time the ticket reached the passenger.

In the second place, the sale of tickets on the cars has been a great handicap to conductors for the reason that bills of large denomination are constantly presented for change, and errors are much more likely to be made while the conductor is receiving fares on a well-filled car than will often happen at a ticket office window.

With less attention and time required in taking fares and making change, conductors will be the better able to care for the safety of their passengers and cars.

Meeting of Missouri Short Line Committee.—In a report of the meeting of the Missouri Short Line Safety Committee, published in the ELECTRIC RAILWAY JOURNAL of Jan. 6, page 32, the safety organization of the Kansas City, Clay County & St. Joseph Railway, the name of J. D. Bowersock was erroneously given. The speaker on that occasion was I. D. Hook, attorney for the road.

Louisville Publication Reiterates Responsibility of Employee.—*Trolley Topics*, the company publication of the Louisville (Ky.) Railway, has helped to perpetuate one phase of the doctrine of publicity by quoting in its columns the text of an editorial which appeared in the ELECTRIC RAILWAY JOURNAL of Nov. 4, 1916, headed by a cartoon entitled "Every Employee a Publicity Representative."

Kentucky Court Condemns Accident Running.—Efforts of the Louisville (Ky.) Railway to discourage the practice of certain attorneys soliciting damage cases against the company, have been in the main sustained by decisions of the Kentucky courts. In a recent case the Kentucky Court of Appeals ruled that the attorney may not collect a $500 contingent fee from the railway company because his employment as attorney was secured by illegal solicitation and was against public policy. The opinion of the court distinguished between personal solicitation and the "indefensible and vicious practice of employing agents and runners to go about the country soliciting business and stirring up strife and securing litigation for a stipulated compensation or a contingent fee."

Sedalia Company Describes Its Problems.—The City Light & Traction Company, Sedalia, Mo., a Doherty property, has embodied a series of its Sedalia illustrated newspaper advertisements into a booklet of facts just issued about the operating, management and personnel of the company. Each advertisement is devoted to a certain phase of operation, well calculated to interest the reader, such as the modern equipment of the Sedalia cars and their safety devices; the power house and the auxiliary units which must be maintained in order to prevent interruption of service; the company's office and the hospitality it offers; the platform men and the extent of their work; the cost of trolley wire, track and car repairs, and the economy of going to work in trolley cars as compared with automobiles.

"The Missouri Short Line."—"The Missouri Short Line" is the familiar title that has crept into popular usage for the Kansas City, Clay County & St. Joseph Railway operating between Kansas City and St. Joseph, Mo., and between Kansas City and Excelsior Springs. The Kansas City public had referred to the "Excelsior Springs Route" when reference was meant to that division, and to the "St. Joseph Line" when the other division was intended. Speaking casually of the Kansas City, Clay County & St. Joseph Railway, the abbreviation used was "Clay County Road." This designation omitted entirely Kansas City, St. Joseph, Excelsior Springs, Jackson County, Mo., Buchanan County and Platte County. To obviate any unintended partiality, the name "Missouri Short Line" was decided upon.

Kentucky Pass Rulings.—First rulings in the Kentucky courts relating to rights of pass-holders and obligations of railways, under the new anti-pass law in effect in Kentucky, have favored the pass-holders. Two plaintiffs sued to compel the Kentucky Traction & Terminal Company to continue honoring passes issued to them in consideration of their giving rights-of-way to the company. The plaintiffs contended that the Federal constitution provided against passage of laws such as to abrogate contracts. When the Kentucky law became effective, the company, and others in the State, notified the holders of perpetual as well as other passes that they would no longer be honored. The

railway is seeking merely an interpretation of the law in such cases and will appeal from the decision, although it has no desire to evade its contract.

Four Killed in an Accident in Ohio.—On the afternoon of Jan. 27 a head-on collision occurred between a freight and a passenger car on the Cleveland, Southwestern & Columbus Railway, near Strongsville, Ohio, which resulted in the death of four persons and the injury of a number of others. Clarence T. Kemerer, motorman of the passenger car, and Orr H. Dawson, chief electrician of the road, were among the dead. The cars took fire after the collision and were destroyed. A second wreck occurred on the Cleveland, Southwestern & Columbus Railway, 3 miles north of Wooster, on Jan. 29, William Gauweiler, motorman on a passenger car, running extra and without passengers, was killed. The car struck a work train. One or two other employees of the company were injured. The car took fire and was totally destroyed.

Massachusetts Commission Publishes Inspection Figures.—During the year the inspection department of the Massachusetts Public Service Commission, according to its 1916 report, made 4040 car inspections and found defects in 918 cases, including untidy conditions. The number of fatal accidents to individuals investigated was 105. The number of accidents due to broken or loose wheels, broken journals and axles reported was 115; miscellaneous accidents investigated, such as collisions, personal injuries and accidents caused by faulty operation, 592; accidents caused by spread rails, broken rails, defective special work, poor surface and alignment of track, 746. Accidents caused by persons coming in contact with either fenders or wheel guards or both were: fatal, 24; serious, 15; either fatal nor serious, 280. Lifting jacks were used eight times to extricate persons from under cars, the time ranging from 3 to 15 minutes, usually under 5 minutes.

Jitney Franchises Sought in Portland, Ore.—Franchises for the operation of several jitney lines over various streets in Portland, Ore., sought by Stephen Carver are being published by the City Council. A provision was inserted in the proposed franchises requiring Carver to provide a bond of $1,000 for each of the two proposed East Side grants, and a bond of $500 covering the proposed West Side grants, as a guarantee that within thirty days after the franchises become effective, he will begin to operate motor buses over the various designated routes, and will continue to operate them for at least six months thereafter. Additional bonds of $10,000 for each of the two East Side grants and $7,500 for the West Side franchise will be required to cover any damages resulting from accidents to patrons of the various lines. Vice-President F. I. Fuller and Attorney R. A. Leiter, of the Portland Railway, Light & Power Company, objected to the routing of the jitneys on any streets on which street cars of the company operate, because of the danger and from the standpoint of fairness to the company. The charge which will be made against the jitney operators under the proposed franchises is a quarterly fee of $1 for each seat in the jitney.

New York's Annual Fares Almost 2,000,000,000.—For all the transit lines in Greater New York during 1916 there was an increase in passengers carried over 1915 of 91,000,000, according to the recent annual report of the Public Service Commission of the First District of New York. The number of fares collected during the year ended June 30, 1916, was 1,898,735,615, against 1,807,632,726 for the preceding year. The amount of fares collected during 1916 was $93,176,216, an increase of more than $4,000,000, or nearly 5 per cent over 1915. The payment of transportation on these lines during 1916 was $17.80 per capita. During the year the Interborough Rapid Transit Company carried a total of 371,505,312, an increase of 25,919,569 over the previous year. During the latter part of 1916 the subway not infrequently carried an average of more than 1,400,000 passengers a day. In conclusion the report points out that the 1916 record for accidents on railroads and street railroads in New York City exceeded that for 1915 by more than 5000. In 1915 the total number of accidents was 66,208, and last year the total was 71,854. The number of persons killed in such accidents in 1915 was 231, against 251 in 1916.

Personal Mention

Fred M. Weld has been appointed master mechanic of the Holyoke (Mass.) Street Railway.

G. C. Chadderdon has been appointed chief engineer of power station of the Springfield (Ohio) Railway.

J. J. Molyneaux has been appointed auditor for the Southwestern utility properties of H. M. Byllesby & Company, Chicago, Ill.

A. H. S. Cantlen has been elected president of the Quakertown (Pa.) Traction Company, a subsidiary of the Lehigh Valley Transit Company.

James H. Porter, superintendent of distribution of the Oskaloosa Traction & Light Company, Oskaloosa, Iowa, has been appointed general superintendent of this company.

Max H. Prill, vice-president of the Centralia & Central City Traction Company, Centralia, Ill., has been appointed general manager, succeeding his father, Max Prill, who remains as president.

George W. Davison, one of the vice-presidents of the Central Trust Company, New York, has been elected a director of the Third Avenue Railway, New York, succeeding the late Frederick W. Whitridge.

Martin Delehanty, foreman of the Cold Spring carhouse of the International Railway, Buffalo, N. Y., has been promoted to the position of assistant general carhouse foreman in charge of car cleaning and sanitation.

R. J. McElravy, for the past three years superintendent of the East Liverpool Traction & Light Company, has been appointed general manager, succeeding C. A. Smith, who will continue as president of the company.

A. E. Ward, who has been affiliated with the Reading Transit & Light Company in Reading, Pa., has been appointed as manager of the Lebanon properties of this same company, to succeed Harry G. Louser, resigned.

R. S. Metzger, of the Toledo Railways & Light Company, Toledo, Ohio, has been added to the force of the safety department of Henry L. Doherty & Company, having charge of all safety matters pertaining to railway work.

R. J. Hole, who has been local manager of the Salisbury & Spencer Railway, Salisbury, N. C., has become manager in charge of operations in all divisions of the North Carolina Public Service Company, and will move to Greensboro.

R. P. Stevens, president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, was elected a member of the board of directors of the Cleveland Electric Illuminating Company at the annual meeting on Jan. 24.

Paul S. Duenweg, assistant manager of the Galveston (Tex.) Electric Company, has been promoted to the position of secretary to L. C. Bradley, district manager of the Stone & Webster properties in Texas, with headquarters in Houston.

C. S. Pinkerton, formerly associated with the Guaranty Trust Company, New York, as assistant auditor, has been elected treasurer of J. G. White & Company, Inc., and the J. G. White Engineering Corporation, of New York, succeeding R. B. Marchant.

Frederick L. Ray, who has resigned as superintendent of steam equipment for the Louisville (Ky.) Railway, was guest of honor at a banquet given by Kentucky No. 1, National Association of Stationary Engineers. There were forty men present and farewell addresses were made.

Douglas I. McKay has been elected a vice-president of J. G. White & Company, Inc., New York. Mr. McKay, who at one time was Police Commissioner of New York City, has been connected with J. G. White & Company, Inc., for more than two years in the capacity of assistant to the president.

G. C. Still, chief engineer of the Cumberland County Power & Light Company, Portland, Me., and the York County Power Company, has also been appointed chief engineer of

the Lewiston, Augusta & Waterville Street Railway and the Westbrook Electric Company, which are controlled by the Cumberland County Power & Light Company.

Sanger B. Steel has been elected a vice-president of J. G. White & Company, Inc., New York. Mr. Steel, prior to his recent election, was manager of the Chicago office of the banking and brokerage firm of Paine, Webber & Company, Boston, and his activities with the White corporation will be in connection with handling and distributing securities.

Clinton B. Smith has been made superintendent of schedules and time-tables of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio. Mr. Smith is a graduate of Worcester Polytechnic Institute. He completed the cadet course with the Public Service Railway of New Jersey and was with that company for some time as a traffic investigator.

G. L. Enfors, who has been superintendent of the repair shops and the railroad division of the Porto Rico Railway, Light & Power Company, Ponce, P. R., for four years, has been promoted to also take charge of the trolley division of this company, with the title of superintendent, succeeding J. E. Burns, resigned. Mr. Enfors previously was connected with the Boston (Mass.) Elevated Railway in the engineering department for seven years and for twelve years was connected with the Fitchburg & Leominster Street Railway, Fitchburg, Mass., as superintendent of motive power.

R. O. Launey has been appointed editor of the *Buzzer*, the employees' weekly magazine of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed Frank Hammond, resigned. Mr. Launey has shown a great interest in the publication of this magazine, and has been a large factor in its success. He has been with the company since April, 1904, and holds the position of auditor. He has taken an active part in athletic and welfare work. Before becoming affiliated with the above-mentioned company Mr. Launey was connected with the public utilities at Savannah, Ga., where he was born.

C. R. Collins, assistant engineer in the engineering department of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has left this company to go with the Grays Harbor Railway & Light Company, Aberdeen, Wash., where he will assume the position of general superintendent and chief engineer. Mr. Collins is a graduate of Purdue University of the class of 1907. Since 1909 he has been connected with the Puget Sound Traction, Light & Power Company, being successively in the substation, meter, distribution and operating departments, and holding the positions of superintendent of distribution, operating superintendent in charge of meters and distribution.

S. T. Henry has resigned as second vice-president of the McGraw Publishing Company, Inc., and on Feb. 1 became identified with the American International Corporation, New York, as vice-president of a subsidiary organization which will handle the export of contractors' machinery and equipment. In his comparatively brief career with the McGraw Publishing Company Mr. Henry has made remarkable progress. Entering the organization, after graduation from the University of Illinois, in August, 1904, as an assistant on the editorial staff of the *Engineering Record*, he rose rapidly through the positions of Western editor, Cleveland advertising representative, and Western manager of the paper to the junior vice-presidency of the company. Since his promotion to a general executive position his duties have pertained to all the properties of the company, including, in addition to the *Engineering Record*, the *Electrical World*, the ELECTRIC RAILWAY JOURNAL, and *Metallurgical & Chemical Engineering* and *Electrical Merchandising*.

J. W. Brown, since 1913 assistant general superintendent of the Public Service Railway, Newark, N. J., is the editor of the new employees' publication of that company, the *Trolley Weal*, described elsewhere in this issue. Mr. Brown has been connected with the Public Service Railway since April, 1911. Before that he was with the Aurora, Elgin & Chicago Railroad and prior to that time was superintendent of transportation of the West Penn Railways, Connellsville, Pa. He entered the service of the McKeesport, Wilmerding & Duquesne Railway, McKeesport, Pa., about fourteen years ago as night car dispatcher. He also served as electrician and later as power station engineer of this company. When the Pittsburgh, McKeesport & Connellsville Railway was formed, Mr. Brown was made master mechanic of the McKeesport Division of that road and later was promoted to division superintendent. When the transportation department of the company was organized in 1903 he was appointed superintendent of transportation of the company. He resigned from the West Penn Railways in August, 1910, to become connected with the Aurora, Elgin & Chicago Railroad. Previous to his present operating position on the Public Service Railway, Mr. Brown was assistant superintendent of transportation.

Edward A. Maher, Sr., vice-president and general manager of the Third Avenue Railway and its subsidiary companies, has been elected president of the company to succeed the late Frederick W. Whitridge. Mr. Maher was born in Albany, N. Y., in 1852. He attended the public school and after graduation from the State Normal School entered politics, was successively president of the Board of Supervisors of Albany and a member of the Assembly from that city. He served as Mayor of Albany from 1888 to 1890. Upon expiration of his term he was made vice-president and general manager of the Albany Electric Illuminating Company. Mr. Maher came to New York City in 1892 and was made president of the Union Railway. In 1896 the Third Avenue Railway took over the Union Railway properties and Mr. Maher retained his position as president and general manager of the Bronx and Westchester subsidiary company. When Mr. Whitridge was elected receiver of the Third Avenue Railway in 1908, Mr. Maher was made general manager. Later when the receivership was lifted and Mr. Whitridge was elected its president, Mr. Maher was made vice-president and general manager of the line, which positions he held until his recent election. He had direct charge of meeting the strike situation which began in Yonkers last summer and later extended to the entire Third Avenue System.

Obituary

Orr H. Dawson, chief electrician of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, was killed in a collision on Jan. 27 between two cars on the company's line.

Robert E. Sheldon, who served for more than thirty years as a director of the Columbus Railway, Power & Light Company, Columbus, Ohio, and a portion of that time as vice-president and as president, died at his home in that city on Jan. 20. Mr. Sheldon resigned his position as president of the company in 1912.

John P. Dwyer, auditor of disbursements for the Boston (Mass.) Elevated Railway, died on Jan. 28 at his home in Newton as a result of shock from his wife's recent death. Born in Saratoga Springs, N. Y., sixty-two years ago, Mr. Dwyer came to Boston and as a boy took employment with the old West End Street Railway. He worked up to the office which he held at the time of his death. He is survived by a son, a daughter and a sister.

A. A. Thurlby, superintendent of transmission for the Chicago Surface Lines, died on Jan. 23. Mr. Thurlby was born in Nottingham, England, in 1860, and came to America in 1868. He began work with the Brush Electric Company, Cleveland, Ohio, where he became an erecting engineer. In 1891 he resigned that position to become manager of the Battle Creek (Mich.) Street Railway. The following year he accepted the position of engineer for inside wireman with the Chicago Edison Company. In 1893 he accepted a position with the People's Light, Power & Motor Company, Chicago, as assistant superintendent in charge of overhead lines. He remained with that company when it was absorbed by the Commonwealth Edison Company, but resigned in 1899 to accept the position of manager of the Manistee (Mich.) Electric Railway. In 1902 he became associated with John R. Walsh in his electrical projects, but resigned in 1907 to return to the Commonwealth Edison Company. In 1907 Mr. Thurlby was appointed superintendent of underground and overhead wires and cables of the Chicago City Railway, which position he held until his appointment with the Chicago Surface Lines in 1914.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Stanley Railway Company of New Britain, New Britain, Conn.**—Application for incorporation has been made by the Stanley Railway Company of New Britain to construct a line between New Britain and Hartford. Capital stock, $100,000, with power to increase it to $300,000. Incorporators: Mayor George A. Quigley, Senator George M. Landers, James M. Curtin and E. O. Kilbourne, New Britain, and John A. Pilgard, Hartford.

***Franklin County Traction Company, Benton, Ill.**—Incorporated to construct an electric railway from North City to Benton via Christopher. Capital stock, $50,000. Incorporators: C. W. Gardner, Christopher; E. B. Gardner and F. B. Buchanan, West Frankfort, and C. C. Baldwin, Centralia.

Sapulpa (Okla.) Electric Interurban Railway.—Incorporated in the State of Oklahoma as a successor to the Sapulpa & Interurban Railway, operating between Sapulpa, Kiefer and Glen Pool, 12 miles, and bought in under foreclosure by the bondholders on Sept. 9, 1916. Capital stock, $200,000.

***Hampton & Langley Field Railway, Hampton, Va.**—Incorporated to construct a line from Hampton to the Langley aviation field, 4 miles. The line will connect with the Newport News & Hampton Railway, Gas & Electric Company. The promoters of the road are the principal owners of the Newport News & Hampton Railway, Gas & Electric Company, but the new company will maintain a separate corporate identity. Officers: J. N. Shannahan, president; F. W. Darling, vice-president, and H. R. Booker, secretary-treasurer.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the City Council for a fifty-year franchise to operate the proposed subway route from the Fourth Street station to Vineyard.

Waukegan, Ill.—The recent franchise submitted by the Chicago, North Shore & Milwaukee Electric Railroad has been accepted by the city of Waukegan.

Tipton, Ind.—The Tipton-Frankfort Traction Company will ask the City Council for a franchise to construct a line in Tipton. R. D. Wynn, Tipton, is reported interested. [Dec. 30, '16.]

Takoma Park, Md.—The Council of Takoma Park has voted to grant a franchise to the Washington & Maryland Railway to construct an extension from the district line, the present terminus of the line to the bridge across Sligo Creek. It is understood that upon completion of the line it will be leased to the Capital Traction Company.

Lawrence, Mass.—The Bay State Street Railway has received a franchise from the City Council of Lawrence to construct a line on Water Street from Ames Street to the Methuen line.

Worcester, Mass.—Mayor Pehr G. Homes has signed the franchise recently passed by the Board of Aldermen granting the Worcester Consolidated Street Railway permission to extend its tracks on Greenwood Street to the city line.

Milan, Ohio.—The Lake Shore Electric Railway has asked the City Council of Milan for a new twenty-five year franchise.

Maryville, Tenn.—An election will be held on Feb. 24 on the proposition to grant a franchise to the Knoxville Railway & Light Company to construct a line in Maryville. The company proposes to construct a line from Maryville to Knoxville.

Waterford, Wis.—The Milwaukee Electric Railway & Light Company has received a franchise from the City Council to furnish electric service in Waterford.

TRACK AND ROADWAY

Visalia Electric Railroad, Exeter, Cal.—The options on various strips of land through orange groves held by the Visalia Electric Railroad for the proposed route into Lindsay from a point 1 mile east of the city has expired, but an extension was granted by the owners until such time as the Railroad Commission passes on the objection raised by the Santa Fé Railroad in opposition to the electric road crossing its yards.

Martinez & Concord Interurban Railway, Martinez, Cal.—At a recent meeting held in Martinez, details of the proposition for building the Martinez & Concord Interurban Railway were discussed. It is proposed to build the road at a cost of $159,499 and to issue bonds in this amount, $90,000 to be subscribed by property owners along the route and people of Martinez who are to pay 30 per cent of their subscription when the road is built and in actual operation and the remaining 70 per cent within twenty years. It is proposed to issue twenty-five-year 6 per cent first mortgage bonds in the sum of $125,000 to sell at not less than 90 and $60,000 par value of the capital stock to sell at not less than 80. The road will be built through Martinez under the franchises heretofore granted, out the Pacheco Road to near the McMahon ranch, thence eastward to a connection with the Santa Fé Railroad near Avon and the Cowell Road and the Oakland, Antioch and Eastern Railroad at the Government Ranch. Clifford McClellan, San Francisco, is interested. [Sept. 30, '16.]

Denver (Col.) Tramway.—This company will construct a loop from the foot of Seventeenth Street in front of the Union Station,

Connecticut Company, New Haven, Conn.—The Public Utilities Commission of Connecticut has ordered the Connecticut Company to extend its line on Dixwell Avenue, Hamden, to a connection with its line into New Haven via Whitney Avenue.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—This company will construct an extension on Mable Street from Vandever Avenue to its power plant.

West Coast Electric Railway, Sarasota, Fla.—It is reported that Hiram McElroy, Tampa, is making surveys for this company's proposed line from Tampa to Bradentown and Sarasota, about 50 miles. A. E. Townsend, Sarasota, general manager. [Sept. 16, '16.]

Atlanta & Anderson Electric Railway, Atlanta, Ga.—The route of the proposed Atlanta & Anderson Electric Railway has been decided upon and surveys have been begun. The line will connect with the Piedmont & Northern Electric Railway at Anderson. The road will cross the Savannah River at a point near Brown's Ferry. J. L. Murphy, Atlanta, is interested. [Dec. 16, '16.]

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.—As noted more in detail elsewhere in this issue the Chicago, Milwaukee & St. Paul Railroad proposes to equip 220 miles of its railroad in the State of Washington for electrical operation.

Chicago, North Shore & Milwaukee Electric Railroad, Highwood, Ill.—This company will make some extensive repairs to its track on County Street, Waukegan.

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.—Work has been begun by this company on its extension to Carbondale and it is expected that operation will be begun by June.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company is now securing franchises, permits, etc., preparatory to building an extension from Paxton to Gilman next spring.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—Following a disagreement over franchise matters, the Aurora, Elgin & Chicago Railroad has ceased to operate cars through the city of Batavia. Cars operate now only to the city limits.

Interstate Public Service Company, Indianapolis, Ind.—This company will lay new 90-lb. rails on Washington and Third Streets, Columbus, preparatory to new paving. The track will be laid on creosoted ties embedded in concrete.

Vincennes (Ind.) Traction Company.—This company will build a baseball park near Lakewood, adjacent to Vincennes.

Wichita Railroad & Light Company, Wichita, Kan.—This company will extend its College Hill line from Roosevelt Avenue to East Street. The company is now in the market for rails for the line. It is estimated that the extension will cost about $50,000.

Orleans-Kenner Electric Railway, New Orleans, La.—A report from the Orleans-Kenner Electric Railway states that it will construct a line between Kenner and Destrehan, 6 miles.

United Railways & Electric Company, Baltimore, Md.—The new Hanover Street bridge over the Patapsco River has been completed and operation over the structure has been begun by the United Railways & Electric Company. The cost of the bridge and its approaches was $1,250,000, $150,000 of which was paid by the United Railways & Electric Company.

***Ocean City, Md.**—The Isle of Wight Land Company, Ocean City, is reported to be in the market for about 10 miles of relaying rails, 60 to 70 lb. per yard. C. Edward Shute, secretary.

Boston (Mass.) Elevated Railway.—In response to an order made by the Legislature last year, the Massachusetts Public Service Commission has sent to the Legislature a report embracing plans for extensive changes in the structure of the elevated railway on Atlantic Avenue so as to accommodate freight traffic for a short distance. It is estimated that the proposed changes would cost about $3,000,000.

Kansas City (Mo.) Railways.—This company reports that it expects to build 8 or 10 miles of new track during 1917.

United Railways, St. Louis, Mo.—Although no formal application has been made for the change, it is said that the route of the Hamilton line of the United Railways may be extended to connect it with the Market Street line. This will make it a crosstown line, extending from the Wellston loop to the Market Street line south of Forest Park. This would afford to residents of several thickly populated subdivisions and suburbs west and southwest of Forest Park an outlet with transfer privileges to east and west lines.

Chautauqua Traction Company, Jamestown, N. Y.—The Julian-Beggs Signal Company, Terre Haute, Ind., has received a contract to install signal and speed control appliances on the lines of the Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railroad. It is estimated that the cost of the installation on the two roads will be about $250,000.

Cleveland (Ohio) Railway.—A report from the Cleveland Railway states that it expects to construct 10 miles of new track during 1917.

Scioto Valley Traction Company, Columbus, Ohio.—The Scioto Valley Traction Company, in order to secure an independent entrance into the city of Columbus, has leased from the State the bed of the old canal feeder from the Lockbourne road to Main Street, 11 miles. The period of the lease is twenty-five years and the rental $6,000 per year. The bridge over the Hocking Valley Railway and the grade crossing over the Norfolk & Western Railroad, south of the city, will be eliminated. The cars will be operated from the intersection with Main Street over that thoroughfare to the proposed new union station.

Portland & Oregon City Railway, Portland, Ore.—The completion of the Portland & Oregon City Railroad between Portland and Highland at an early date was forecasted recently when representatives of the Security Savings & Trust Company, Portland, made arrangements to file a trust deed necessary to the issuance of $350,000 in bonds, money derived from the sale of same to be used in early construction. The company, which operates 15 miles of line between Portland and Bakers Bridge on the Clackamas River, plans ultimately to build a branch from Dedman Station to Oregon City. Ballasting of the 15 miles of track under operation and the construction of the line from Bakers Bridge to Highland, about 8 miles, will begin in the spring, according to present plans.

Denver & Ephrata Street Railway, Denver, Pa.—The directors of the Conestoga Traction Company have authorized the lease on completion of the Denver & Ephrata Street Railway, recently incorporated to construct a line between Denver and Ephrata, about 4 miles. [Dec. 2, '16.]

***Hershey, Pa.**—It is reported that plans are being considered for the construction of an electric railway for passenger and freight between Hershey and Reading, via Jonestown, Fredericksburg, Bethel, Rehrersburg, Strausstown, Bernville, Mt. Pleasant, etc., and that application for a charter will be made before April 1.

Philadelphia, Pa.—The installation of a trackless trolley to serve the Byberry section has been recommended by M. J. Ryan, Public Service Commissioner, in connection with plans for the extension of the Frankford elevated line to this point.

Sioux Falls (S. D.) Traction System.—This company reports that it will probably construct 2 miles of new track during 1917.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Plans are being made by the Puget Sound Traction, Light & Power Company to construct a plate-girder bridge over Lake Washington Canal at Latona.

Seattle & Rainier Valley Railway, Seattle, Wash.—This company reports that it will construct a 1-mile branch line and will reroute approximately 1 mile of its present main line.

SHOPS AND BUILDINGS

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has acquired a lot in Ludlow as a future station site.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—This company has purchased a large tract of ground in the rear of its carhouse on Lower Lisbon Street and plans to construct a new paint shop.

Worcester (Mass.) Consolidated Street Railway.—This company will construct a freight station on Shrewsbury Street, adjoining Boulevard Park.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—A new passenger station will be built by the Buffalo & Lake Erie Traction Company in Irving.

Southern Traction Company, Dallas, Tex.—This company plans to construct a new interurban passenger and freight station in Waco.

POWER HOUSES AND SUBSTATIONS

Iowa Railway & Light Company, Cedar Rapids, Iowa.—This company is constructing a new power plant in Perry, the buildings being practically completed. The company is extending its service in the vicinity of Perry, and the new plant will be used to supply the demand for energy.

Centerville Light & Traction Company, Centerville, Iowa.—This company will install in its powerhouse one 2500-kw. turbine and condenser, one cooling pond and two 500-hp. boilers, and will build one stack. The company will also erect 30 miles of 33,000-volt transmission line.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has begun the installation of a new steam boiler and a 4000-kw. generator at its power house in Lexington.

Hagerstown & Frederick Railway, Frederick, Md.—A contract has been let by the Hagerstown & Frederick Railway for the installation of a 9000-hp. steam turbine-driven electric generator with auxiliaries as an addition to the power output of the company's plant at Security, which, when completed, will give the power station at Security a capacity of 15,000 hp.

Great Northern Railroad, St. Paul, Minn.—The Great Northern Railroad plans to construct a 120,000-hp. plant at Lake Chelan which will generate energy for electrifying the Cascade division. The proposed plant will cost about $5,000,000.

Interborough Rapid Transit Company, New York, N. Y.—This company has acquired property on East Fifty-seventh Street between Third and Lexington Avenues for the purpose of erecting a transformer station to distribute electric current for the operation of trains in the new Lexington Avenue subway and other lines which the company operates. Plans are being prepared by the company for the construction of a substation at 150 West Sixteenth Street, to cost about $40,000.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Business Announcements Trade Literature

Good Year for Coasting Recorders and Accessories Predicted

Many Orders Reported—Deliveries Slow—Material Problems Complex—Production for Next Six Months Contracted For—Progress Being Made

According to C. C. Chappelle, vice-president and consulting engineer of the Railway Improvement Company, New York, indications point to a large volume of business in the sale of coasting recorders, terminal clocks, sanitary straps, anti-climbers, etc., for the coming year, even exceeding that of last year, which from the viewpoint of many manufacturers of railway accessories was the most prosperous year for more than a decade. Inquiries were fairly active during the early summer months of last year, but since that time the market has picked up considerably and a number of large orders have been placed. At the present time this company has orders on hand that will absorb in excess of 50 per cent of the 1917 production, and prospective orders pending indicate the company's production will be taxed throughout the year.

Material Problems Complex

The coasting recorder, which forms the greatest volume of this company's product, is an assembled machine consisting of a clock mechanism recording device, with its electrical relay for connection with the car wiring.

During the middle of last year the factory had a considerable stock of material such as steel, sheet brass and copper wire, but the scarcity of skilled labor at that time was a handicap to production. This condition obviously caused considerable wage increase. At a later period the availability of labor had improved, but the manufacturer faced a shortage of raw material that tended to continue the curtailment of production.

The company always has endeavored to make deliveries dependent upon the purchaser's ability to install the coasting recorder equipments. As a rule the company has been able to make shipments for installation as fast as the purchaser's cars are available for equipment. For instance, if one company places a large order it is only necessary to make deliveries in accordance with that company's schedule for availability of its cars. In changing from summer cars to the regular equipment it is common practice to leave the relay and wiring intact on the car, removing only the coasting recorders.

Prices Fluctuate with Copper and Steel Market

Regardless of the rising costs of material and the numerous delays in obtaining it, this company did not at first increase its prices but pursued a policy of watchful waiting, as the conditions were considered abnormal. As soon as the surplus supply of raw material was exhausted and it was apparent that the basic materials for the product—copper, steel, etc.—would continue to rise, the company was forced to increase prices. These increases amounted to only about 10 per cent, with the exception of that for Rico anti-climbers, which was approximately 50 per cent. This was because a surplus of anti-climber material had been rolled on the special rolls owned by the company previous to the advance in materials, and when the stock was exhausted the price was increased in even less proportion than the increase in price of raw material.

Progress Being Made

The experience of the past few years has proved that the electric railways are adopting certain standard devices in car equipment, and these are usually specified when an order for cars is placed. That real progress by the railways is being made is evident from the fact that many accessories—anti-friction journal bearings, improved fare boxes, coasting recorders, trolley retrievers, anti-climbers, sanitary straps, pneumatic door engines, etc.—are now in common use.

The requirements for a proper knowledge of traffic conditions which will permit not only of proper conservation of power but also economical schedule speeds make necessary the collection of data from which the existing transportation conditions can be analyzed. With this idea in view the company is developing a coasting and service recorder which will record accurately and automatically the number and duration of stops, running time, coasting time—in fact, will keep an absolute check on the changing factors constantly encountered in transportation service.

The cost of power for railways has materially increased, due to higher fuel and labor costs, and more thought is now being given to the need of its conservation. In view of the fact that the rate of fare is fixed and that costs of operation and overhead are increasing, the available method for maintaining the necessary financial status of a property is by reduction of operating expenses through every possible means of increased efficiency in operation.

Wheelmakers Favor Standardization of Flanges

Chilled Iron Wheel Renewals 2,500,000 Annually—Concentrating Efforts to Improve Product—Standardization Will Simplify Wheelmakers' Problems

The Association of Manufacturers of Chilled Car Wheels, of which George W. Lyndon, McCormick Building, Chicago, is president, represents wheel-casting plants having a capacity of 20,000 wheels per day. The annual wheel renewals for steam and electric railways, according to Mr. Lyndon, amount to 2,500,000 wheels per year, and this figure does not include the requirements for new cars. All the members of the association have had a satisfactory year and look forward to even better business for 1917, providing the car builders are able to turn out their orders on schedule. Just now, not many of the wheel plants are running at full capacity because of the scarcity of labor.

Association Favors Standardization

This association, through its president, has expressed its hearty appreciation of the standardization work being carried on by the committees of the American Electric Railway Engineering Association. It is ready to co-operate to the fullest extent in the standardization of wheel flanges for city and interurban work.

Speaking of the need for standardization of wheel flanges in interurban service, Mr. Lyndon pointed out that a great many interurban roads are handling M. C. B. equipment. Some roads in connection with steam affiliations are using joint tracks, and all roads are tending toward higher speeds. As a natural consequence the requirements of heavy interurban service indicate the need for the use of a flange with a contour as near that of the M. C. B. standard flange as can be operated. Standardization of the flange, of course, would simplify the wheel makers' problem so far as furnishing equipment for interurban cars is concerned.

On the other hand, Mr. Lyndon says, there are many sections of rail in city properties that forbid the use of the M. C. B. flange, and so one of smaller dimensions must generally be chosen. The tendency throughout the country is to recommend a flange somewhat like the M. C. B., but flatter, say ⅝ in. in height.

The Chilled Iron Wheel Association members are concentrating their efforts on the improvement of their product.

At the engineering experimental station of the University of Illinois elaborate testing equipment has been put at the disposition of the wheel makers, and special studies are now being made. One of these includes an investigation of the stresses in all parts of the wheel, not only the stresses in the outer part of the wheel due to brake heating but also those in the hub and plate due to pressing the wheel onto the axle. Mr. Lyndon says that Dean Goss of the University of Illinois considers the work being done at the experimental station not only of great interest to the institution, because of its technical nature, but also of value to the public, because wheel service is such an important factor in successful transportation.

Helping Small Manufacturers in Export Trade

The full report now available for the Fourth National Foreign Trade Convention, held in Pittsburgh, Pa., on Jan. 25-27, shows that the most popular group sessions were those devoted to the foreign trade problems of the small manufacturer and merchant. The dependence of foreign trade on foreign investment, on banking facilities and a sound shipping policy was strongly emphasized, however, and, as stated in the preliminary report in last week's issue, the dominant note of the whole convention was co-operation.

Practically every problem of foreign trade expansion that confronts the small manufacturer and merchant when he desires to sell overseas had been covered in advance by a series of questions and answers, available to the convention in pamphlet form. These questions and answers served to draw out a great variety and volume of valuable experiences of the manufacturers and merchants present.

The sentiment of the convention, as a whole, was summed up in the report of the general convention committee. As has been customary in the past, no resolutions were presented. The committee merely reported what it considered to be the consensus of the convention, as developed in the papers and discussions. The development of foreign trade was said to depend upon the resources and enterprise of this country and on the education of a body of young men fitted for the demands of foreign trade and anxious to participate therein. It depends further on the participation of a large number of moderate-sized firms. The government can help in many directions by securing suitable commercial treaties, by collecting from abroad and disseminating here information regarding foreign requirements, by permitting co-operation, etc. The need for the prompt passage of the Webb bill was emphasized, while the necessity for a sound shipping policy, for straightening out the treaty situation and for a flexible tariff was discussed.

The present officers of the National Foreign Trade Council who were elected at the annual meeting held last fall are as follows: Chairman, James A. Farrell, who is president of the United States Steel Corporation; treasurer, Walter L. Clark, and secretary, Robert H. Patchin.

Future Business Prospects—Effect of Peace

According to the current review of the National City Bank, the first month of the new year has given good promise for a continuance of prosperity. The leading industries of the country made large profits last year, and are in a very strong position financially. Indebtedness has been paid or reduced, working capital has been increased, capacity has been enlarged and efficiency improved by expenditures in many instances long contemplated and finally made possible by the unusual earnings. The outlook for business is excellent, with bookings of firm orders sufficient to assure general industrial activity well into the last half of the year. The probably effects of peace upon industry are significant. A considerable readjustment of prices will be necessary and the demoralizing influence of falling prices are fully appreciated. However, manufacturers are buying materials with that thought uppermost, but current trade is on the largest scale ever known and provision must be constantly made for it.

The most talked of factor in the situation is the car shortage, which results less from an actual shortage of cars than from inability to keep the traffic moving freely. The situation, instead of being a temporary and passing one, seems to be due to the unparalleled expansion of industry, which has produced a volume of freight beyond the loading, unloading and warehousing facilities of the public, and the switching and terminal facilities of the railways.

Building operations reached record proportions in 1916, and at present the outlook is for another equally active year. The prices of all building materials are very firm or still tending upward.

The year starts out with money much the cheapest commodity or form of capital in sight, and if the business community attempts to use these abundant supplies the effect will be to lift wages and the prices of all materials still higher. The circle of rising wages and prices narrows as it moves upward, because everybody's income and purchasing power do not increase in the same proportion, and prudent men hesitate to make capital investments on an inflated basis.

Business has been so good during the past year that a great many producers have accumulated large profits and are more independent of borrowing facilities than heretofore. They are conservative about dividends, and intend to keep themselves forehanded.

The general level of bond prices continues to hold firm. The average price of forty listed bonds as compiled by the *Wall Street Journal* was 96.11 Jan. 26 compared with 94.97 Dec. 26. The advance has been especially noticeable in railroad issues.

CURRENT PRICES FOR MATERIALS

Quoted Thursday, Feb. 1.

Copper (electrolytic)	New York, 33 cents per pound
Rubber-covered wire (base)	New York, 38 cents per pound
No. 0000 feeder cable (bare)	New York, 35 cents per pound
No. 6 copper wire (bare)	New York 35 cents per pound
Tin (straits)	New York, 45¾ cents per pound
Lead	New York, 8 cents per pound
Spelter	New York, 10¾ cents per pound
Rails, A. S. C. E., O. H.	Mill, $40 per gross ton
Rails, A. S C. E, Bess.	Mill, $38 per gross ton
Wire nails	Pittsburgh, $3 per 100 pounds
Steel (bars)	Pittsburgh, 3.25 cents per pound
Sheet iron (black, 28 gage)	Pittsburgh, 4.50 cents per pound
Sheet iron (galv., 28 gage)	Pittsburgh, 6.25 cents per pound
I-beams over 15 in.	Pittsburgh, 10 cents per pound
½-in. galv. extra high strength steel wire,	New York, $6.82 per 100 ft.
¾-in. galv. high strength steel wire	New York, $3.41 per 100 ft.
⅜-in. galv. Siemens-Martin wire	New York, $2.52 per 100 ft.
5/16-in. galv. Siemens-Martin wire	New York, $1.94 per 100 ft.
Galvanized wire (ordinary)	Pittsburgh, 3.65 cents per pound
Cement (carload lots) without rebate for sacks,	New York, $2.07 per barrel
Cement (carload lots)	Chicago, $1.96 per barrel
Cement (carload lots)	Seattle, $2.60 per barrel
Sand in large lots	New York, 50 cents per ton
Sand in large lots	Chicago, $1.25 per ton
Linseed oil (raw, 5-bbl. lots)	New York, 96 cents per gallon
Linseed oil (boiled, 5-bbl. lots)	New York, 97 cents per gallon
White lead (100-lb. keg)	New York, 9¾ cents per pound
Turpentine (bbl. lots)	New York, 54½ cents per gallon

OLD METAL PRICES

Copper (heavy)	New York, 28½ cents per pound
Copper (light)	New York, 24 cents per pound
Red brass	New York, 19 cents per pound
Yellow brass	New York, 18 cents per pound
Lead	New York, 6.75 cents per pound
Steel car axles	Chicago, $34 per net ton
Zinc	8 cents per pound
Iron car wheels	Chicago, $18.50 per gross ton
Steel rail (scrap)	Chicago, $24.50 per gross ton
Steel rail (relaying)	Chicago, $30 per gross ton
Machine shop turnings	Chicago, $9.25 per net ton

New York Railways to Be Equipped with Coasting Recorders

The New York Railways has just placed an order with the Railway Improvement Company for Rico coasting recorders to take care of its 1842 cars. With this order, all of the large electric railways operating in or entering New York will be equipped with Rico coasting recorders as follows: Interborough, elevated and subway, including the Corona and Astoria lines in Queens, 1718; Third Avenue Railway System, including Yonkers Railroad, Westchester Electric Railroad, 1125; Brooklyn Rapid Transit System for 300 New York Municipal subway cars; Hudson & Manhattan Railroad, 200; Long Island Railroad, 55; making a grand total of 5240.

ROLLING STOCK

Shreveport (La.) Railways has ordered four new light-weight, single-truck, double-end cars.

Wheeling (W. Va.) Traction Company is reported to be in the market for eight pay-as-you-enter cars.

Austin (Tex.) Street Railway has ordered seven light-weight, single-truck, double-end cars from the American Car Company.

North Carolina Public Service Company, Greensboro, N. C., has ordered fifteen light-weight, single-truck, double-end cars from the American Car Company.

Wichita Railroad & Light Company, Wichita, Kan., has ordered fifteen light-weight, single-truck, single-end cars from the St. Louis Car Company.

Urbana & Champaign Railway, Gas and Electric Company, Champaign, Ill., has added a snow-sweeper to its equipment.

Indiana Railway & Lighting Company, Kokomo, Ind., is in the market for two 35-ft. two-man, double-truck, double-entrance pay-as-you-enter motor cars for city service.

Ottawa Car Manufacturing Company, Ltd., Ottawa, Canada, has received an order from the Ottawa Electric Railway for three 38-ft., single-end, double-truck, semi-steel cars.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has been authorized by the Public Service Commission of Illinois to issue $170,000 of equipment gold notes, the proceeds to be used for the purchase of fifteen steel cars.

Kansas City (Mo.) Railways during the coming year expect to purchase twenty-five cars at a cost of approximately $150,000. Coasting clocks or recorders will be installed on these cars.

Northern Ohio Traction & Light Company, Akron, Ohio, lost eight cars recently at Massillon in a fire which destroyed the company's substation and carhouse. The total loss was about $50,000.

Public Service Railway, Newark, N. J., noted in the ELECTRIC RAILWAY JOURNAL of January 27, has purchased at this time, seventy-five quadruple West. 514-C motor equipments with HLD control and twenty-five double West. 307-CV motor equipments with HL control. The GE No. 200 motors with PC control mentioned were ordered early in the fall and were noted in the ELECTRIC RAILWAY JOURNAL for September 30, 1916.

TRADE NOTES

H. D. Gumpper, who was formerly associated with the Emerson Company, efficiency engineers, has joined the electric truck sales department of the Buda Company, Chicago.

Diehl Manufacturing Company, Elizabeth, N. J., announces the change of address of its Chicago storeroom and repair department to 313 South Clinton Street.

Philadelphia Holding Company, Philadelphia, Pa., has received an order from the Fishkill Electric Railway for four radial trucks and also an order for one radial truck from the Levis County Railroad, Quebec, Canada.

Safety Car Devices Company, St. Louis, Mo., announces that it has received orders for air brake and safety-control equipment to be used on the cars being constructed for the following companies: Wichita Railroad & Light Company, fifteen cars; North Carolina Public Service Company, fifteen cars; Austin Street Railway, seven cars, and the Shreveport Railways, four cars.

Horne Manufacturing Company, 50 Court Street, Brooklyn, N. Y., announces that Albert C. Henry has been elected president of the company, and will now devote a considerable amount of his time to the electric railways in the vicinity of New York City. Mr. Henry was formerly connected with the Cooley Manufacturing Company, and with the National Carbon Company.

R. H. Beaumont Company, Philadelphia, Pa., builder of coal- and ash-handling machinery, etc., announces the opening of a New York office in the Hudson Terminal Building, 50 Church Street. The office will be in the charge of William P. Alexander, who has been associated with the company for a number of years in the capacity of field superintendent, assistant chief engineer and sales engineer.

Charles H. Clark, engineer maintenance of way, Cleveland Railways Company, has recently received orders for the Clark pavement plow from the United Railways, St. Louis; the Twin City Rapid Transit Company, Minneapolis; the Brooklyn Rapid Transit Company and the Public Service Railway, Newark, N. J. These plows are in use at present in Detroit, Boston, Buffalo and Cleveland.

Harry T. Bigelow, who for sixteen years was Western representative of the Hale & Kilburn Company, has decided to re-enter the railway supply field and is organizing a strong company to take a general line of specialties for use among the electric and steam railroads. Mr. Bigelow found it necessary about five years ago to retire from active work because of ill health. His many friends in the railway field will be pleased to learn that he is again to become active in the supply field. It has not yet been announced what products he will handle.

American Railways Equipment Company, Dayton, Ohio, announces the completion of its organization for the manufacture and sales of the American coin-ticket registering fare box. Adam Schantz, representing the industrial committee of the Greater Dayton Chamber of Commerce and associated capitalists, supervised the financing of the company. D. B. Whistler, inventor and patentee of the fare box, is president and general manager. Under the new organization, plans have been effected for manufacturing the fare boxes on a scale to meet requirements. The company has recently received an order from the City Railway of Dayton to equip all its cars with American coin-ticket registering fare boxes. More than 100 fare boxes will be required to complete the order.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued a catalog on "Arc Lamps and Lighting Systems."

Morse Chain Company, Ithaca, N. Y., has issued publication No. 15, "A Chain of Evidence," which deals with power drives of less than 100 hp. each.

Composite Metal Lath Company, 128 Broadway, New York, N. Y., has issued a circular showing a cut of a 2¼-in. electric cable illustrating the use of brick lath as a base for protecting cables in manholes from fire.

Cement Gun Construction Company, Chicago, Ill., has issued bulletin No. 5 on "Gun Crete for Protection." This bulletin gives a number of illustrations of buildings protected by this waterproof and fireproof material, which is composed of cement and sand.

Spray Engineering Company, Boston, Mass., has issued bulletin No. 250 which illustrates and describes its "Spraco" equipment for washing and cooling the ventilating air for steam turbine-driven generators and other equipment.

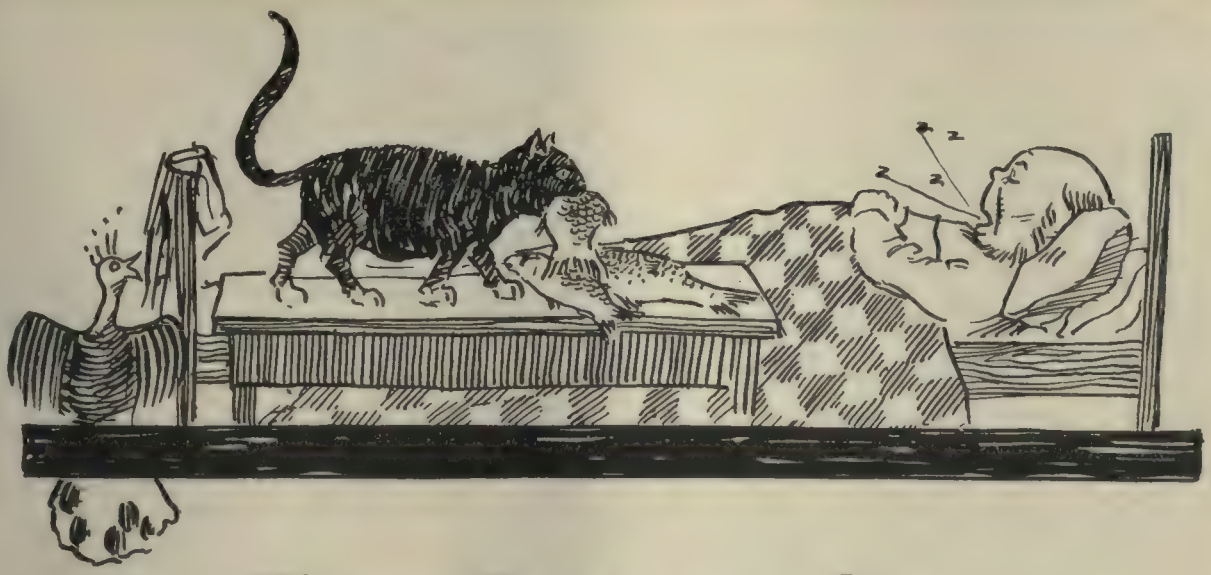
NEW PUBLICATIONS

United States Government Specifications for Portland Cement. Bureau of Standards, Department of Commerce, Washington, D. C., Circular No. 33. Forty-three pages. Paper.

The third edition of this specification is now ready for distribution and can be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents per copy.

Les Chemins de Fer en Angleterre, by J. Carlier and H. Dedroog. A reprint from Le Génie Civil, 6, Rue de la Chaussée-d'Antin, Paris, 1916. 168 pages. Paper.

This reprint contains a series of articles on steam railroads and heavy electrifications in England. The authors are Belgian railway engineers, temporarily residing in England. They have compiled data on the principal railway systems, arranging them topically and commenting upon the tendencies indicated by their studies. In the electrical section chapters are devoted to general considerations, line, power generation and distribution, finances and conclusions.



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There was a fisherman in Connemara who always had great luck in catching large quantities of fish; but to his intense annoyance a great cat used to come in at night to devour all the best and finest fish.

Yes, this interests you, brother. Just think of all those fish as fine buffalo **nickels**; and the demon cat as your **accident account.**

Haven't you a Demon Accident Cat which gets away with 5, 6, 7 per cent of your catch?

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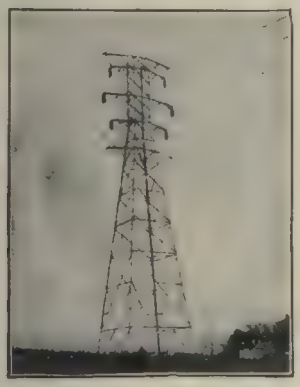
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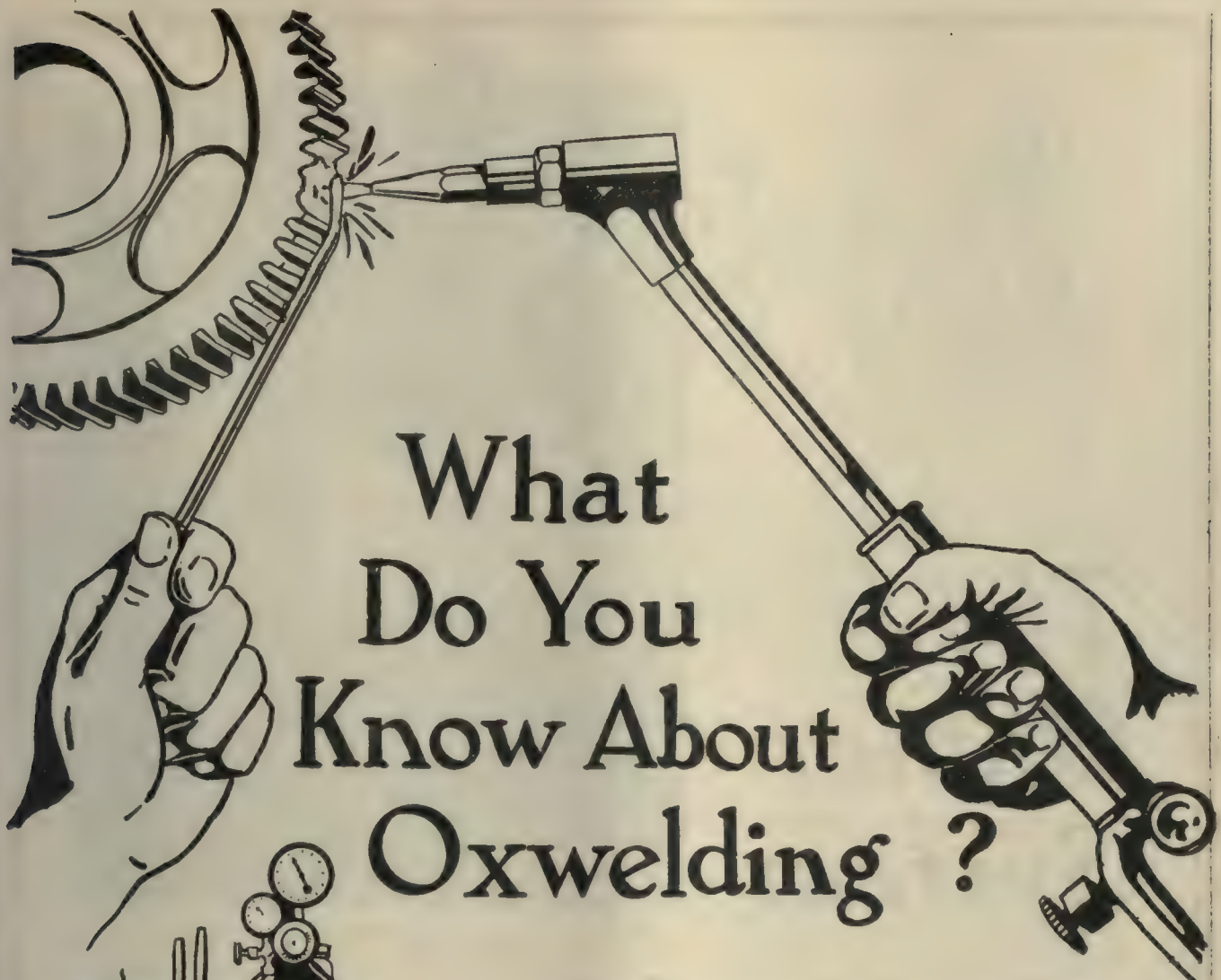
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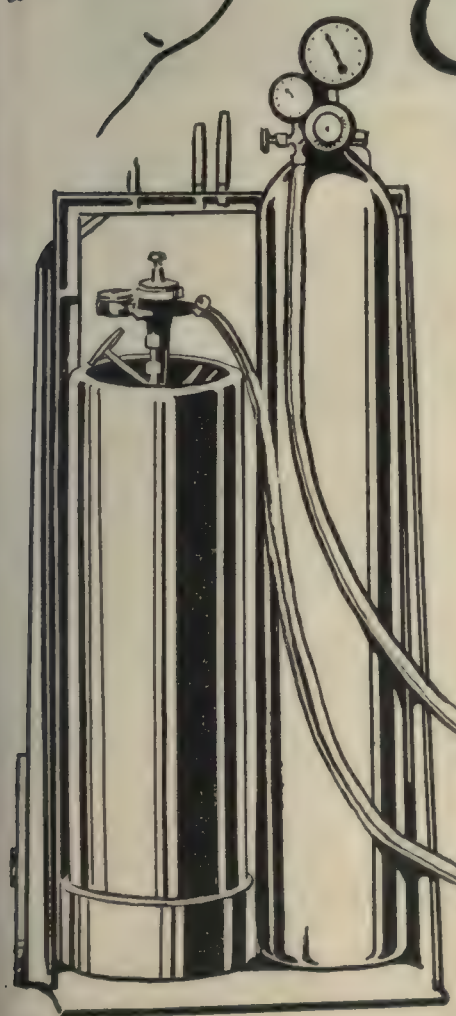
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But have you ever investigated the possibilities of Oxwelding in your own business?

Many a master mechanic and maintenance engineer has saved his company thousands of dollars per year by employing Oxwelding in repair work, bonding and track maintenance. Now comes a new application (originated by a user) which radically reduces the cost of car parts by cutting them from scrap steel plate.

And yet the surface hasn't been scratched. In addition to these uses which *you know* will increase the efficiency and reduce the cost of your department, you may develop new applications that will lead to further economies for your company.

Surely a process of such unlimited possibilities is worthy of careful investigation. We have made it easy for you by preparing special articles on Oxwelding in the electric railway business.

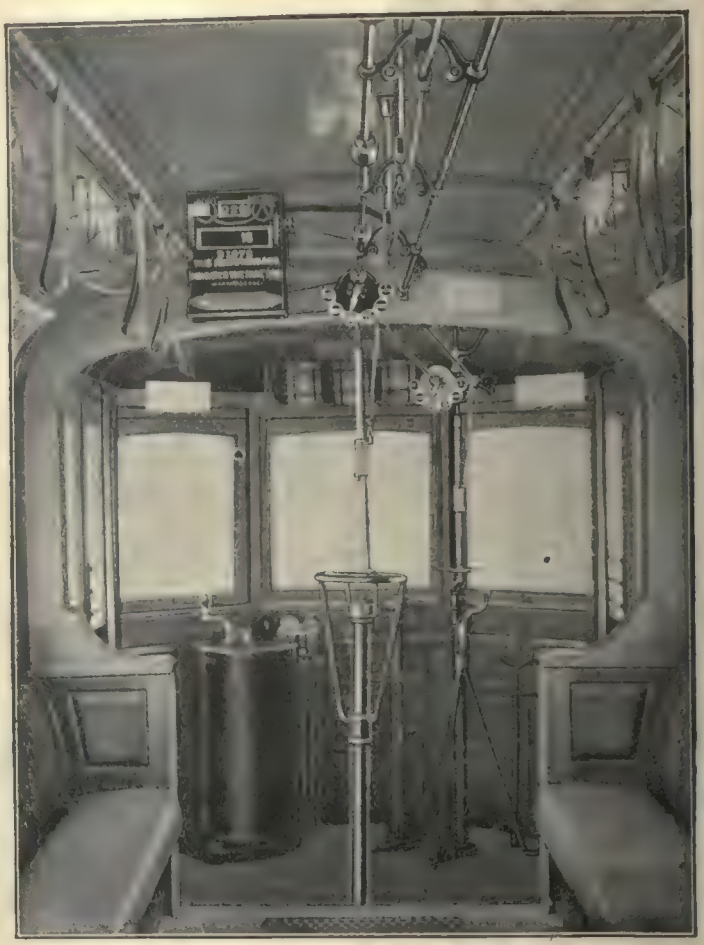
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An Ohmer Fare Register equipment adapted to one man, two man, pay as you enter or pay within operation.

THE Ohmer System solves the problems of fare protection because it leads the conductors to co-operate for the best interests of the business. The men know that their efforts will be recognized and the quality of their work understood. They know also that dishonesty and inefficiency lead logically to discharge or discipline.

The Ohmer System succeeds because it recognizes the human factor in the business of collecting fares; because it removes the temptation to go wrong and leads the conductor along the road of efficiency and loyalty.

The Ohmer System succeeds because it is an intensely practical method of applying the principle of the cash register, immensely successful where goods are sold at retail, to the selling of transportation on electric railway cars.

Ohmer Fare Register Company

Dayton, Ohio



"You were going to tell us something more about the Rooke Automatic Register," said the Treasurer.

"Sure enough," replied the General Manager. "I ought to begin with the frank confession that I thought the Rooke Automatic Register was a small town register, pure and simple.

"The biggest shock I got on that point was when the wife and I went Christmas shopping on Fifth Avenue, New York. Of course, we took a lot of bus rides up and down the avenue. Most of the buses are double-deckers, the stairways and aisles are a lot narrower than our cars and many passengers are short riders.

"What's more, there's a bigger proportion of strangers among these passengers than on any other line in the United States.

"And what do you suppose the Fifth Avenue Coach Company uses for fare collection in this difficult service—the

Rooke Automatic Register!

"That experience led me to write to the Rooke Automatic Register Company for the names of other installations. Here are a few of the companies named—

"Providence, R. I.; Bangor, Me.; New Bedford, Mass.; Concord and Portsmouth, N. H.; Elmira, Binghamton and Watertown, N. Y.—cities that cover a wide variety of operating conditions.

"As Providence is the biggest road which uses Rookes only, I made up my mind to go there on the quiet to see things for myself.

"What I saw in both normal and rush-hour traffic at Providence convinced me that the Rooke System of Fare Collection will GET THE MONEY for us, too.

"Think of it! The Rooke idea has been making good for more than ten years, regardless of whether the cars were open or closed, pre-payment or non-pre-payment, without ever costing the electric railway companies one cent for adaptation to changed conditions.

"Now Boys, that's enough to chew on for today. I'm sold on the Rooke. Next luncheon, I'm going to begin selling you, too."

"We're on," chorused the Board of Strategy, as they filed out for the duties of the afternoon.

Rooke Automatic Register Co., Providence, R. I.



In Fare Collection the Slowest Car Sets the Pace!



Not much use, is there, in trying to operate new cars on the same line with old ones, if the old ones are going to drop back enough to cause delays?

The earlier cars are handicapped enough by old equipment, narrow doorways and high steps without retaining the fare-collection equipment of past days.

To Speed up such Cars you must have

INTERNATIONAL COIN REGISTERS

International Coin Registers give the older cars a fairer show to get over the line because the conductor can handle his passengers more rapidly.

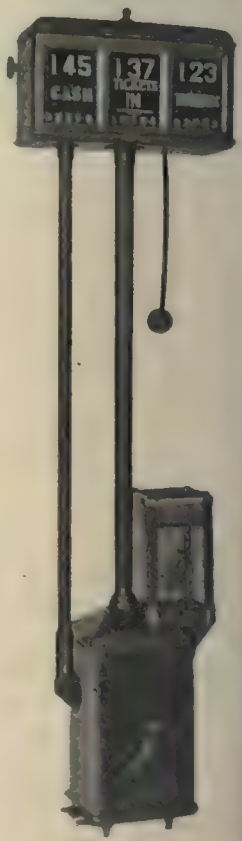
The incorporation of fare box and register in one.

The elimination of pull-rods or cords, and

The harmonization of the fare box count with the register reading

Mean an increase in both speed and accuracy.

Name Your Conditions and
We'll Name the INTERNATIONAL That Meets Them



The International Register Co.

15 South Throop Street, Chicago, Ill.



Car with Agasote Roof in Service 5 years on Third Avenue Railroad, New York

Specify the Ideal Requirements For a Car Roofing Material

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SIXTH—You want economy. Agasote by reason of its ease of application costs less in place than any other *good* roofing material.

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Trolley Shoes

are minimizing maintenance in the Line and Car Equipment Departments



THE many electric railways which have standardized on the Miller Trolley Shoe have found—

That the Line Department favors its use because the clinging, non-arcing contact of the Miller Shoe saves the wire against excessive wear and eliminates battering due to dewired trolley wheels.

That the Car Equipment Department favors the Miller Shoe because it gives much longer wear than wheels and the wearing pieces are replaced at trifling cost.

—and that the Transportation Department

also favors the Miller Trolley Shoe because it does not leave the wire, thus eliminating annoying delays in replacing wheels under the wire and in repairing damaged overhead.

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said the Claim Agent, as he passed over the scrap-book of daily newspaper clippings, "that our townsfolk are beginning to see some good in an electric railway corporation, after all. There's a mighty complimentary article here in the 'Clarion' on the accident reductions noted in their review of our annual report."

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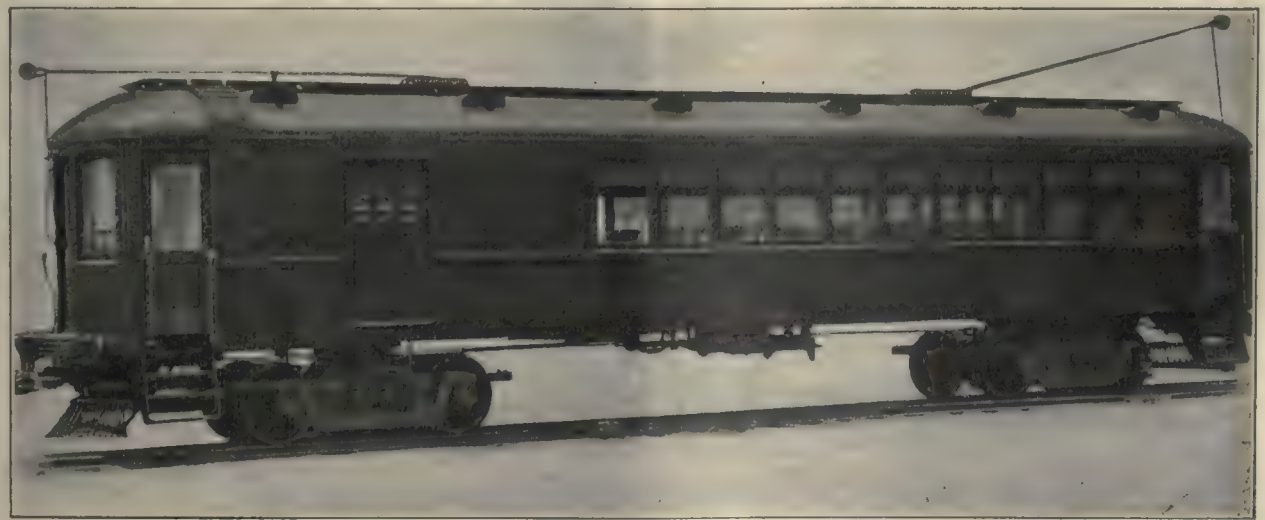
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That one is more economical than another—

Then investigate our trolley wire with a view to cutting your wire costs.

STAR BRAND
Made to Wear, To Wear Well
WEATHER-PROOF WIRE

Weatherproof Wires and Cables

Star Brand

Star Brand Wires are made with long service as the most prominent feature.

Because of their ability to render long service they cut wire costs.

Read the words in the cut of the star.

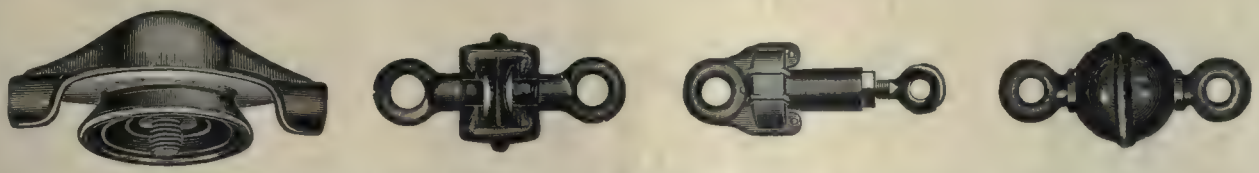
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You Can Minimize Overhead Repair Work

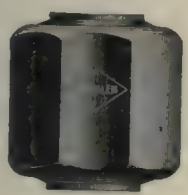
and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

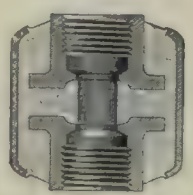
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

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They are forging ahead—and so can you, if you will spend a few hours each week in concentrated study of the

Electric Railway Journal



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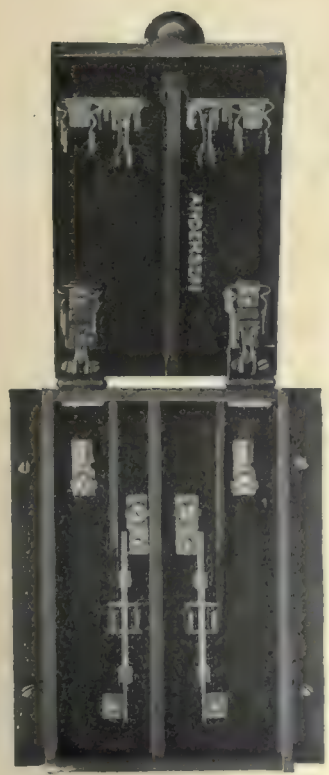
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Write for our catalogs embracing every conceivable fuel or ash handling device.

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One Operation Automatically Opens the Circuit

When you open the box of the

Anderson Ellcon Switch

you open the circuit and leave the fuses entirely disconnected from all live parts. All this in one simple operation.

The entire box of the Anderson-Ellcon switch is made of insulating material—therefore eliminating short-circuits and grounds. Quick-break switch blades prevent injurious arcing.

A switch that will assure absolute protection for your men and your equipment is *bound* to interest you. That's the Anderson-Ellcon Switch.

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SHERWIN-WILLIAMS
RAILWAY LINE

Shortest Route to Best Results

A Product for Every Railway Use

SHERWIN-WILLIAMS

Old Dutch Railway Enamel

S-W Old Dutch Railway Enamel reduces material costs to a minimum, two coats being sufficient over proper undercoatings, instead of the usual two coats of color and two coats of varnish. When a car so finished is reshopped only one coat of Old Dutch Railway Enamel is necessary after cleaning and preparing the old surface.

It will wear longer than any finishing varnish or any other kind of enamel.

Color card on request.

SHERWIN-WILLIAMS

Department of Research

This department represents the best practical and technical knowledge in the field of paint and painting.

The experts of this department are at your service. They will gladly answer inquiries or work with your Department of Tests or with your engineers on any problems in connection with paint or painting that you may have.

There is no charge for this service.

THE SHERWIN-WILLIAMS CO.

Largest Paint and Varnish Makers in the World.

Factories: Cleveland, Newark, Chicago, Montreal, London, Eng.

Sales Offices and Warehouses in Principal Cities.

Address inquiries to

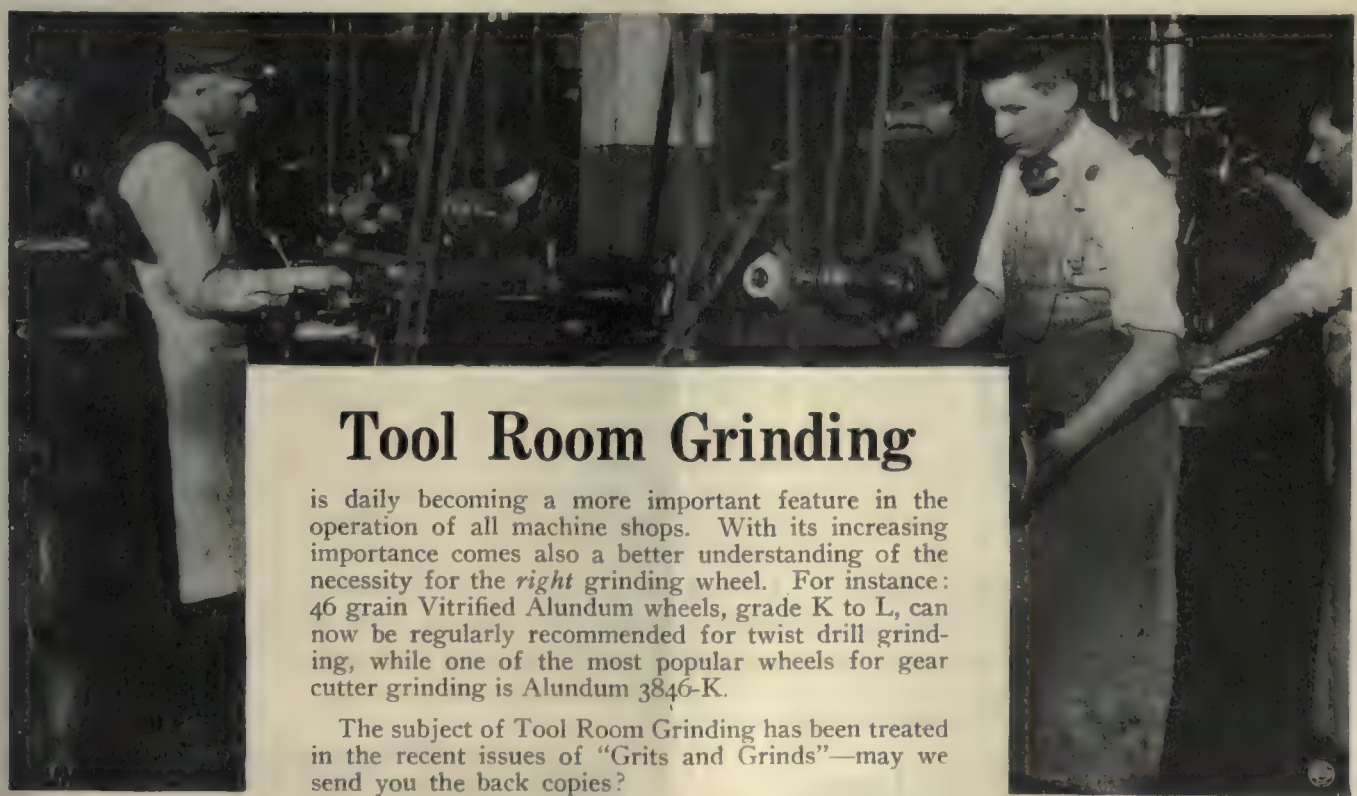
782 Canal Road - CLEVELAND, O.

SHERWIN-WILLIAMS

Railway Flat-Tone

S-W Flat-Tone is intended for producing soft, velvety, flat interior effects. There are twenty-four soft, artistic pastel shades of exceptional richness and depth of tone. Walls finished with Flat-Tone can be repeatedly washed and cleaned without injury. It has exceptional spreading capacity and hiding power. Three coats of the lighter shades and two coats of the darker shades will usually give satisfactory results on new work, while on old work two coats of the lighter and one of the darker shades only are necessary.

Color card on request.



Tool Room Grinding

is daily becoming a more important feature in the operation of all machine shops. With its increasing importance comes also a better understanding of the necessity for the *right* grinding wheel. For instance: 46 grain Vitrified Alundum wheels, grade K to L, can now be regularly recommended for twist drill grinding, while one of the most popular wheels for gear cutter grinding is Alundum 3846-K.

The subject of Tool Room Grinding has been treated in the recent issues of "Grits and Grinds"—may we send you the back copies?

NORTON

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Alundum
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840

THE FORD TRIBLOC



The Leader Among Chain Hoists

Years ago we made the original patented Loop Hand Chain Guide a part of the standard Tribloc equipment, and thereby created the present demand for a safe form of chain guide. We also used steel working parts in our hoist when most, if not all, others were using iron parts.

In the future, as in the past, real improvements in chain hoist design and material will be found first in the Ford Tribloc. We don't wait for "demand," we create it.

You will find our catalog worth having.

Ford of Philadelphia

FORD CHAIN BLOCK & MANUFACTURING CO.

139 Oxford St., Philadelphia, Pa.



Portable Crank Pin Press

Meet the Rising Cost of Labor

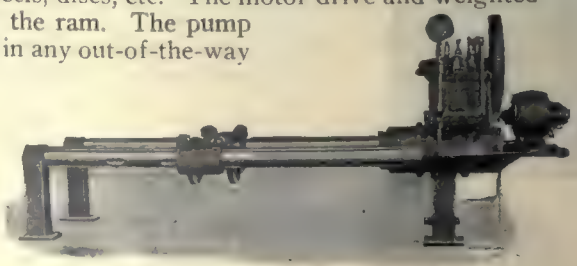
By Equipping Your Shops with Labor Saving Hydraulic Tools

We Build Bond Compressors, Spike Slot Punches, Shaft Straighteners, Rail Benders, Shears, Jacks, Pit Jacks, Motor Lifts, Forcing Presses, Armature Presses, Wheel Presses, etc.

Above is illustrated one of our types of portable tools. It is powerful and durable, built for severe service. These tools are built in sizes ranging from 60 to 300 tons with single and double plunger hand pumps or motor drive as desired.

Below is shown a horizontal press used in machine shops, railway shops, etc., for forcing on and off armatures, forcing gears, bushings, drive wheels, discs, etc. The motor drive and weighted pull back give rapid forward and return movement of the ram. The pump is a self-contained, independent unit, and may be placed in any out-of-the-way position.

Write for Catalogs.



150 Ton Self Contained Horizontal Forcing Press

The Watson-Stillman Co.

Engineers and Builders of Hydraulic Machinery

W-S HYDRAULIC

46 Church St., New York

Chicago, McCormick Bldg.

W-S HYDRAULIC

269



Use

DIXON'S GRAPHITE BRUSHES

and keep your motors or generators running silently and at maximum efficiency.

Commutator surfaces improve under the action of these brushes.

Losses by friction are thus minimized; and sparking and chattering are avoided.

Upkeep costs are decreased.

Our electrical service department is at your command.

Write for
Graphite Brush Booklet No. 108-M

Made in JERSEY CITY, N. J., by the

Joseph Dixon Crucible Company

Established 1827

M

YALE



The Yale Triplex Block for heavy repairs



Yale Hoists

are used for all kinds of lifting and must protect human life and valuable property.

We cannot know which Yale Hoist will be called upon to meet grievous overloads.

For this reason we make each Yale Hoist to safeguard the operator and the load.

The Guarantee of a Yale Hoist is in the hoist.

For sale by Machinery Supply Houses

Put your hoisting problems up to us

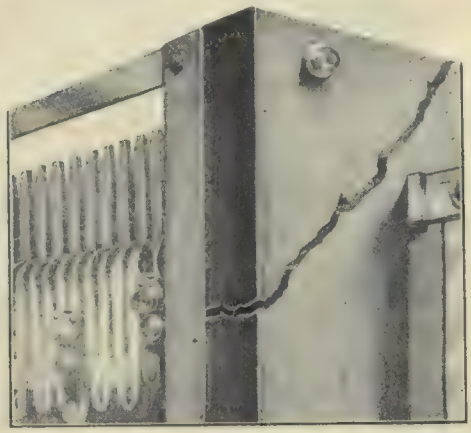
ASK FOR NEW CATALOG

For factory locking equipment use a Yale Master-key System. Write us for particulars.

The Yale & Towne Mfg. Co.

9 East 40th Street
NEW YORK

The HEAT that Cracks Slate will not affect J-M EBONY ASBESTOS WOOD



ONE of the starting-box switches fell out. The short-circuited coils became red-hot and radiated a fierce heat against the stone panel. CRACK! went the slate! And the Central Station had to pay for the purchase and installation of a new panel.

If the panel had been of J-M EBONY ASBESTOS WOOD no expense would have been incurred. Even if the red-hot grids had been in contact with it, there would have been no fracture.

J-M Ebony Asbestos Wood is not only heatproof, but waterproof and oilproof. It is both mechanically and dielectrically stronger than stone. It's lighter, too. And can be handsomely finished.

Learn all about this perfect insulating base material. Write for J-M EBONY ASBESTOS WOOD data—TODAY.

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

Serves more people in more ways than any other Institution of its kind in the world.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
Branches in 55 Large Cities



Twelve Cars of the Terre Haute, Indianapolis and Eastern Traction Company have been equipped with

Bonham Fare and Traffic Recorders

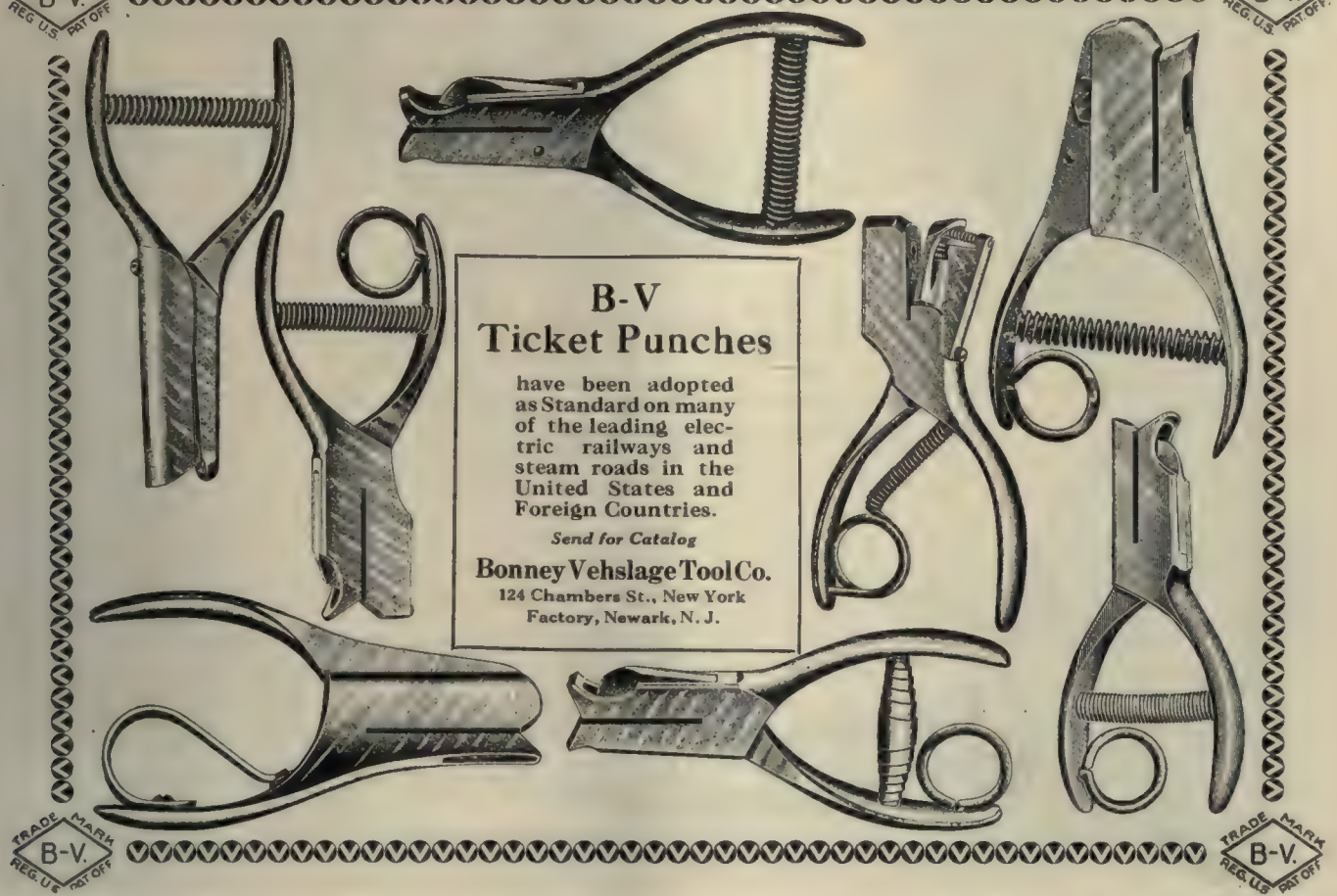
Bonham Recorders show where your passengers come from and where they go to—and you can operate your cars accordingly. It's the solution to the economical handling of interurban traffic.

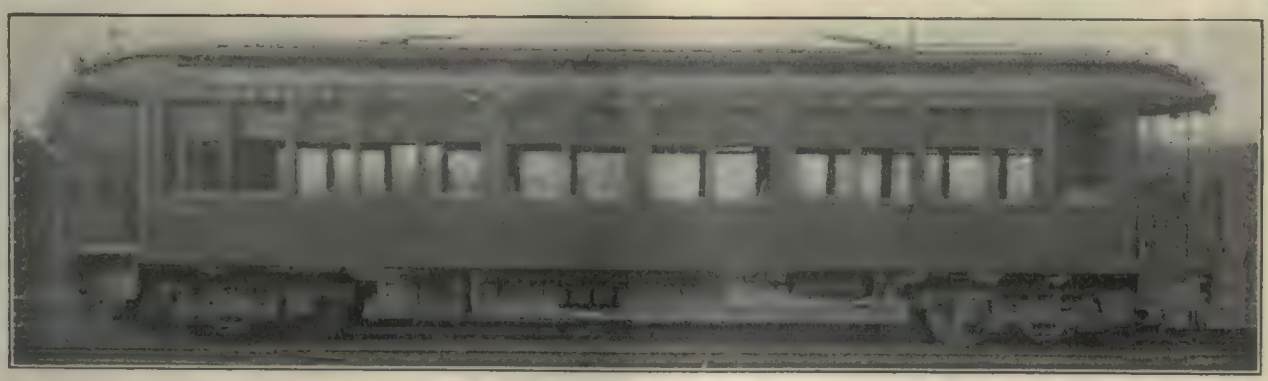
Bonham Recorders enable your operating department to fill out their data immediately upon receipt of the report—and your auditing department can at once check up the earnings of each car and earnings per passenger mile.

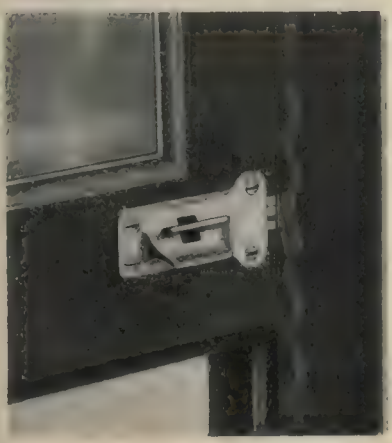
And this accurate record is obtained with a great saving of time, paper and printing over the common duplex receipt system—therefore bigger profits for you.

Ask us to explain *fully* the money saving advantages of Bonham Recorders. We'll be glad to do it.

The Bonham Recorder Co.
Hamilton, Ohio







Chosen for Safety and Efficiency by the Brooklyn Rapid Transit

Everything for the safety, convenience and comfort of passengers receives careful consideration in the selection of equipment for this great railway—and it chose "Edwards" as the "safety and efficiency" sash fixture for hundreds of its big cars.

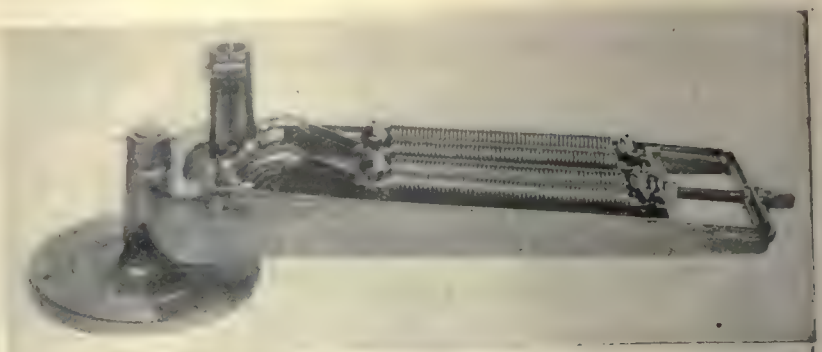
There's a world of merit in Edwards Sash Fixtures. Specify them for *your* cars today.

Our Catalog gives the details. Ask us for a copy.

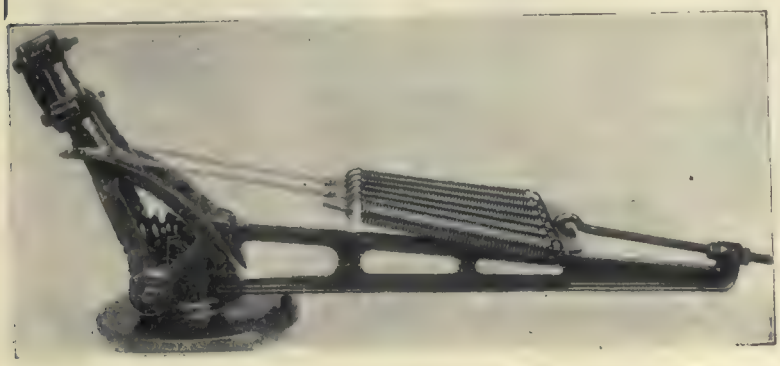
The O. M. Edwards Co., Inc. Syracuse, N. Y.

Window Fixtures
Top, Bottom and Side Weather Stripping
Metal top Casings
Metal Extension Platform Trap Doors
All-Metal Sash Balances and Shade Rollers
Railway Devices

THESE Old Timers were built by us twenty-five years ago.



YOU can buy new trolleys or interchangeable repair parts for them today.



IF you could buy repairs for certain trolleys now in your scrap heap they wouldn't be there.

NUTTALL—PITTSBURG

IF YOU WANT PROOFS

of your advertisements, and time to return them with corrections

Copy Must Be in Our Hands Two Weeks in Advance of Publication Date

Copy Changes. If no proofs are desired your advertisements should be in our hands Wednesday of the week preceding date of publication, otherwise your latest advertisement in accordance with schedule will be repeated.

New Advertisements (not changes of copy) can usually be accepted up to noon Wednesday of the week of publication, but no guarantee can be given as to location or proofs or indexing.

Searchlight Advertisements (Proposals, Wants, For Sale, etc.) received as late as 10 A. M. Thursday will be published if there is space available in the pages that go to press last. The paper is dated and mailed Saturday.



THESE are not arbitrary rules. We do our best to give our advertisers what they want—work overtime if necessary—but each advertising form has to be on the press at a specified time. That is why we cannot guarantee proof or location unless we have copy on time. We want our advertising space to work at maximum efficiency for our advertisers.

The Paper is dated and mailed Saturday

Electric Railway Journal, 239 W. 39th St., New York

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Electricity makes perfect cleanliness possible. Fabrikoid makes it practical. It is impervious to water, grease, sweat, stains, or grime. It can be cleaned as thoroughly as glass with soap and water.

Fabrikoid comfort is constant comfort. It perfectly reproduces and always retains the elegance and luxury of fine leather. It is permanently soft, pliable and satisfying.

Fabrikoid costs less to apply and less to maintain

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Du Pont Building
Wilmington, Delaware
Wendell & MacDuffie Company
Railroad Department Representative
61 Broadway, New York, N. Y.

Put An End To Inefficient Methods

of trolley-wheel lubrication. The alternate layers of bronze and high-grade graphite in the bearing surfaces of



"Bound Brook" Trolley Wheel Bushings

mean highest efficiency and longest service.

"Bound Brook" Bushings are standard equipment almost everywhere—if they are not used on **your** road, look into their merits, and learn how to stop unnecessary outlay for worn trolley wheel bushings.

All genuine graphited "Oil-less Bearings" have always been made at Bound Brook, N. J., in the United States of America, by the

Bound Brook Oil-less Bearing Co.

Formerly Graphite Lubricating Co.

For High Speed Operation
—Large Diameter Kalamazoo Trolley Wheels





As a solution to arcing and short wheel life on high speed electric railway work, two new Kalamazoo Wheels have been designed.

They are (No. 20) 11½ inches and (No. 21) 10 inches in diameter. An ample increase of width, depth of groove and length of hub insures a well-balanced wheel in each case.

Tests covering considerable mileage at high speeds show that these two new "Kalamazoos" greatly decrease sparking, while offering longer wheel life. There is more bearing on the wire, with consequent greater contact and current carrying capacity.

The patented Kalamazoo Harps have been enlarged to carry these wheels.

Try several on your lines. Compare their service with that of smaller wheels.

Write Today.





STAR BRASS WORKS
KALAMAZOO, MICHIGAN

EMB Grid Resistors
ARE MADE RIGHT AND STAY RIGHT

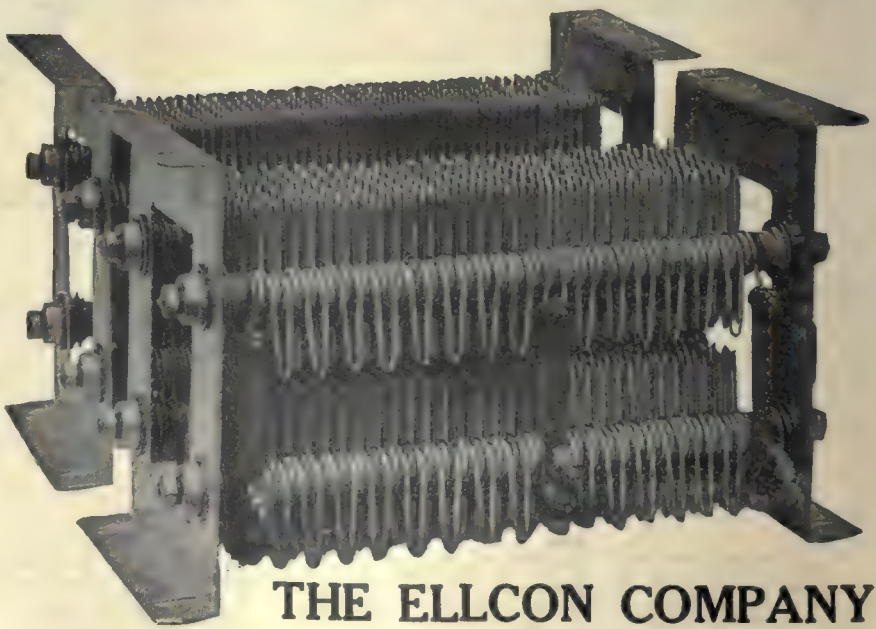
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



THE ELLCON COMPANY
50 Church Street, New York

Ask the Shopmen about CHILLINGWORTH Gear Cases



A reduction of 40% in weight means a saving in time to shopmen whose duty is to handle gear cases—hence economy for you.

They don't love heavy, clumsy malleable iron cases any more than expressmen love a trunk full of horseshoes.

THAYER & COMPANY, INC., Selling Agents in U. S. and Canada **111 BROADWAY, NEW YORK**

Steel for Service

In an advertisement of a prominent gear maker it is to be noted that the rating in service of their "Case Hardened Forged Steel" gears is given at 500, as against their Standard Cast Steel Gears with a rating of 100, and that they guarantee the life of the former to the latter in service will be in that proportion.

The forged steel gears mentioned are cut from

Carnegie-Slick Rolled Steel Gear Blanks

Ask any district office for pamphlet—Rolled Steel Gear Blanks and Miscellaneous Circular Sections.

Carnegie Steel Company

General Offices: Pittsburgh, Pa.

800



A *Perfect* Record

for continuous delivery of high efficiency and reliable, uniform service—this is the backbone of

"Le Carbone"

superiority.

Why not terminate trouble by using a brush that assures Efficient, Economical and Uniform service,—*now* is the time to adopt "Le Carbone" Carbon Brushes.

W. J. Jeandron

173 Fulton Street **New York**



"Use a Pin that WON'T Snap"

Snapped the Magistrate

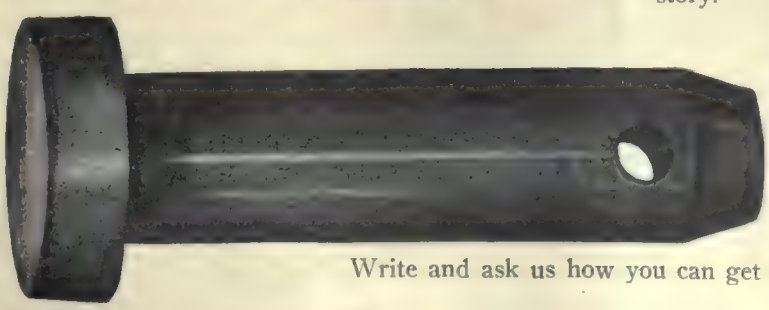
Many an accident is caused by the shearing-off of weak pins in the brake-rigging—but there is always a pin that can be *trusted*. So this story didn't go with the judge. Specify

Boyerized Pins

and you'll never have occasion to tell this story.

Why?—because they are case-hardened. They have been known to last for 300,000 miles —or 2½ years.

"Safety first!" Boyerize your brake rigging *now*.



Write and ask us how you can get big results at small cost.

Bemis Car Truck Co., Springfield, Mass.





GRIFFIN F. C. S. WHEELS

embody the results of scientific development, service data, and an engineering investigation.

Our BULLETIN 18 on chilled iron car wheels for street car and interurban service will give you complete data as to patterns, etc.

F. C. S. wheels mean moderate cost, safety, high mileage and brake shoe economy.

All of our foundries are equipped with complete machine shop facilities for pressing wheels on axles.

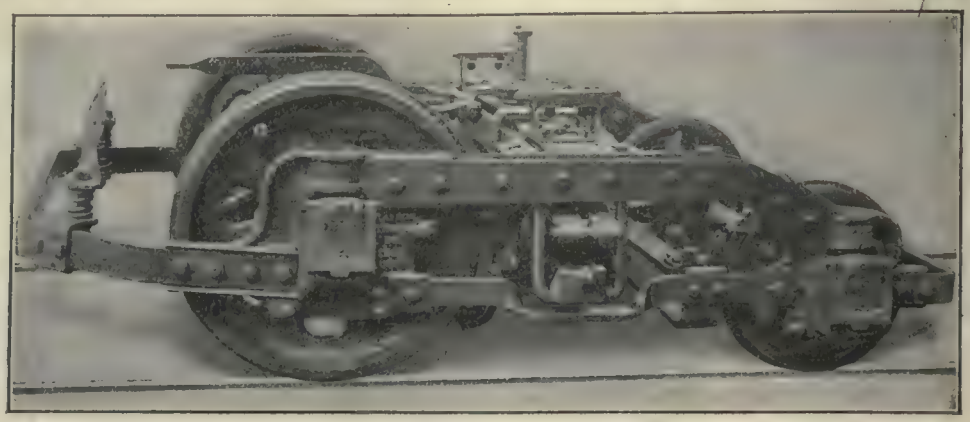
GRIFFIN WHEEL COMPANY

McCormick Building, Chicago, Ill.

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TAYLOR MAXIMUM TRACTION TRUCK



12 FACTS REGARDING "TAYLOR-MADE" TRUCKS

ABSOLUTELY SAFE
RIDE LIKE PULLMANS
SIMPLE IN CONSTRUCTION
REDUCE WEAR OF MOTORS
WILL INCREASE DIVIDENDS
REDUCE COST OF MAINTENANCE

SAVE POWER
SAVE ROAD BED
LIGHT IN WEIGHT
OVERCOME FLANGE WEAR
BRAKES DO NOT CHATTER
PREVENT SIDE OSCILLATION OF CARS

TAYLOR ELECTRIC TRUCK CO.

Established 1892

SPECIFICATIONS ON REQUEST — TROY, N. Y. — SEND FOR PORT-FOLIO



The Car Rider's Car

THE "Car Rider's Car" has proved itself to have the simplest method of fare collection ever devised and in the cities in which it now is in service the riding public has taken to its arrangement naturally and without the necessity of explanations or directions other than entrance and exit signs on the doors. The entering passengers are not held up for their fares until they reach the conductor's station at the center door, and they move rapidly into the car in a double stream, greatly reducing the time necessary for loading an ordinary prepayment car. The division of long- and short-haul traffic is effected unconsciously by the passengers themselves. Those who are traveling the longer distances respond to the attraction of the cross seats in the rear of the car and pass through, paying their fares as they go. Later, when they leave, they require no attention from the conductor except to see that the exits are clear. Those who are going but a short distance naturally choose a place on the longitudinal seats in the front half of the car, paying their fares as they leave the car later. Thus the direct appeal that is made to the public on the score of convenience readily may be seen. That the car has been named properly is shown by its ever-increasing popularity, a number of our most important cities having adopted the type. It is in fact the "Car Rider's Car," built for the convenience of the patron and reacting to his immediate benefit in the time saved in loading and unloading.

PETER WITT, 630 Leader Building, CLEVELAND

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will put off the day when you have to pay a higher rate per Kw-hour to your power landlord for excessive peak-load requirements.

GURNEY BALL BEARING CO.
CONRAD PATENT, LICENSEE
Chicago JAMESTOWN, NEW YORK New York

"Light-Safety" units spell ECONOMY— EFFICIENCY— RESULTS

We specialize in this class of cars and trucks

St. Louis Car Company

THE LINDSLEY BROTHERS CO.

Western **"Good Poles Quick"** Northern

Quick Shipments from our Minneapolis Yard

Rooms 832-834, 72 West Adams St., Chicago, Ill.
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POLES, CROSS ARMS, TIES, TIMBERS, PAVING BLOCKS.
CAPACITY 100,000,000 FEET B. M PER ANNUM
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CEDAR POLES
POSTS, TIES AND PILING
We use C-A-Wood-Preserver in Treating
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Insurance Exchange, CHICAGO

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THESE OFFICES WILL GIVE YOU THE BEST THERE IS IN INSURANCE SERVICE

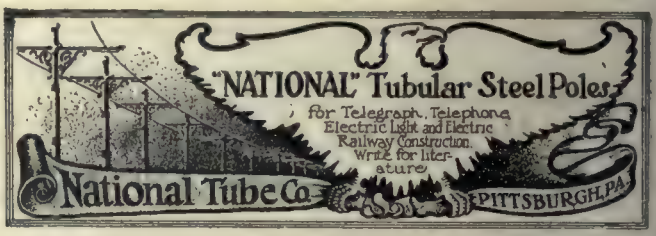
The Trenton THREE SECTION TOWER

outfits for any make of chassis. Make a low, well-balanced outfit on the road with maximum elevation in use.

Send postal for literature and prices.



J. R. McCARDELL & CO., Trenton, N. J.
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DISPATCHER — MOTORMAN
Direct Contact Between
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Write for Details
SIMMEN AUTOMATIC RAILWAY SIGNAL CO.
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FEDERAL SIGNAL CO.

ALBANY, N. Y.
CONSULT OUR ENGINEERS ON YOUR SIGNAL REQUIREMENTS
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TOOLS

for all classes of electrical construction and repair work. Write for catalog.
Mathias Klein & Sons Canal Station 25 Chicago

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Nachod Signals

are automatically set by the car. You do not take a chance with your motorman's memory. Every car is automatically guarded. Buy now; pay later.

Nachod Spells Safety

Nachod Signal Co., Inc.
Louisville, Ky.

STEEL POLES For every pole purpose



Bates Steel Poles in use by the DES MOINES CITY RAILWAY, Des Moines, Iowa, U. S. A.

Strongest STEEL POLE of like weight in the world.
Best STEEL POLE in the world for electric railway trolley service.
Most artistic STEEL POLE in the world for any service.
We make the lowest prices.
We have constantly on hand about two thousand tons of steel and can make immediate shipments.
A full line of convenient malleable fittings.
Our steel pole TREATISE tells a big story, ask for it.

BATES EXPANDED STEEL TRUSS CO.
208 South La Salle St., Chicago, Ill., U. S. A.

ELECTRICAL WIRES AND CABLES



JOHN A. ROEBLING'S SONS COMPANY
Trenton, N. J.

Branches—New York, Boston, Chicago, Philadelphia, Pittsburgh, Cleveland, Atlanta, San Francisco, Los Angeles, Seattle, Portland, Ore.

Permanent Overhead Construction



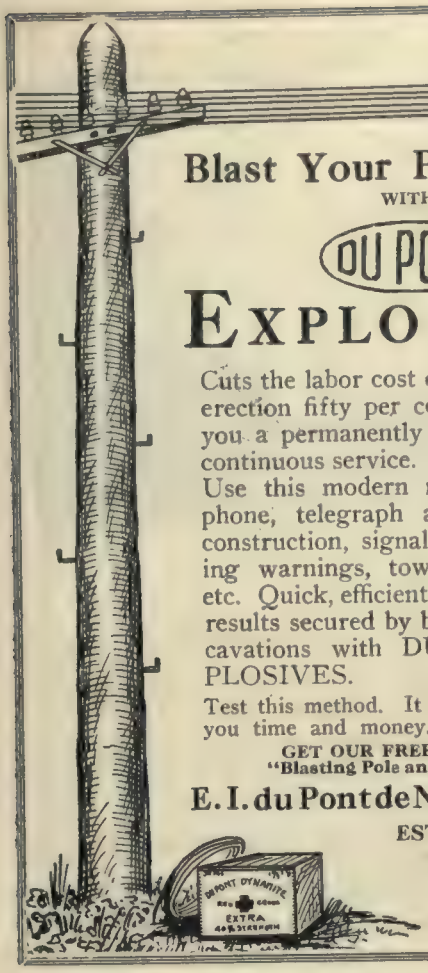
If you find it necessary to rebuild your interurban overhead construction on account of the decay of your wooden poles, write us and we will give you an estimate as to what permanent reconstruction would cost you.

Archbold-Brady Company
Engineers and Contractors
Syracuse, N. Y.

ALUMINUM
Railway Feeders
And all kinds of **Electrical Conductors**

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information.

Aluminum Company of America
Pittsburgh, Pa.



Blast Your Pole Holes

WITH

DU PONT

EXPLOSIVES

Cuts the labor cost of pole and post erection fifty per cent, and insures you a permanently secure line and continuous service.

Use this modern method in telephone, telegraph and power line construction, signal systems, crossing warnings, tower foundations, etc. Quick, efficient and satisfactory results secured by blasting your excavations with DU PONT EXPLOSIVES.

Test this method. It will save you time and money.

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"Blasting Pole and Post Holes."

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ESTABLISHED 1802

Wilmington
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STANDARD

Wires and Cables are cheapest in the end because their superior quality insures durability and dependability

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For Canada: Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont..

An Assurance of Uninterrupted Service



No. 72—10000 Volts

is best secured by a careful selection of the transmission line insulators. It is here that breakdowns are most likely to occur.

Hemingray Insulators

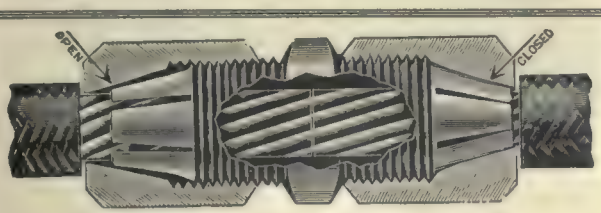
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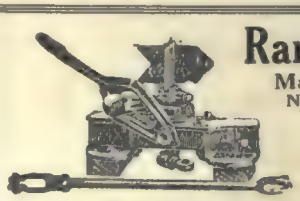
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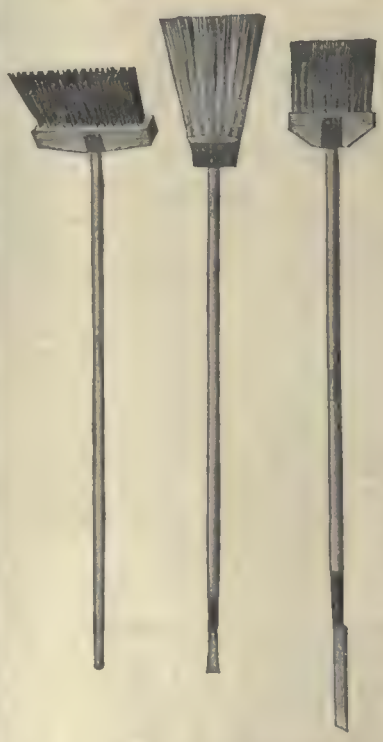
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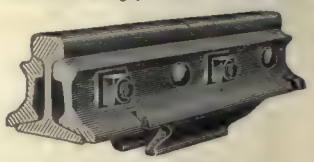
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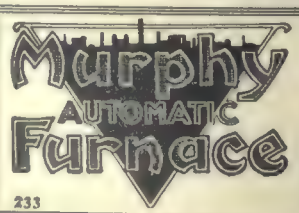
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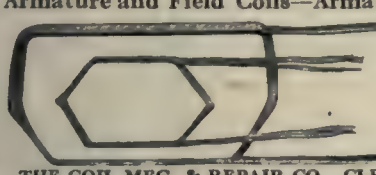
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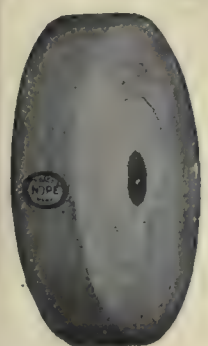
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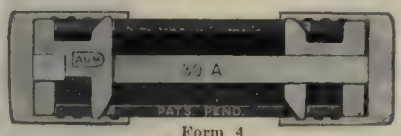
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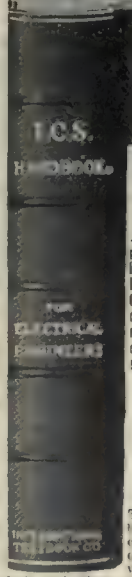
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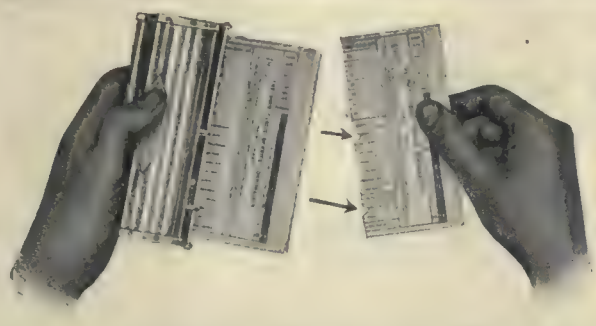
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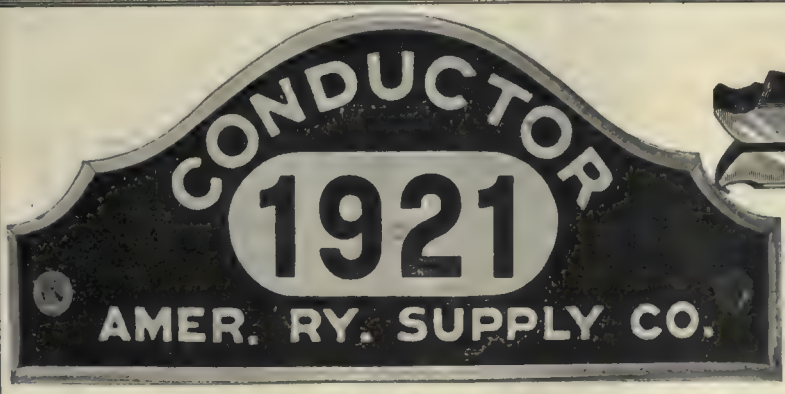
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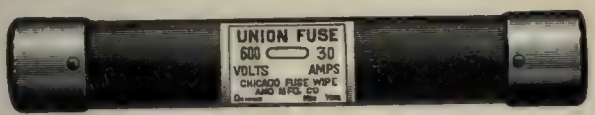
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Eastern Electric Railway Agent
LORD MANUFACTURING CO., NEW YORK

Service

You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

American Brake Shoe & Foundry Co.
30 Church St., New York
McCormick Bldg., Chicago Chattanooga, Tenn.

TULC

MANY SYSTEMS ARE USING TULC after first making most thorough tests under all conditions. Such tests have shown that it will cut lubrication costs in half.

THE UNIVERSAL LUBRICATING CO.
Schofield Building CLEVELAND, O.

LONGWEAR BUSHINGS

For Brake Gear

Hardened
Steel
Accurate
Uniform



also
LONGWEAR
BRAKE PINS
to
Specifications

E.G. Long Company
50 Church Street New York

The "Hycap-Exide" Battery

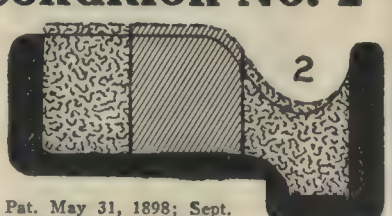
for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

Wheel Condition No. 2

When the Flange and outer portion of tread need truing use this style of



Pat. May 31, 1898; Sept. 1, 1903; Aug. 2, 1904; Dec. 29, 1908; June 15, 1909; April 21, 1914.

Wheel Truing Brake Shoe

You need not keep a crew of men for wheel removal and machines for wheel truing if you use our wheel Truing Shoes.

Wheel Truing Brake Shoe Co.
Detroit Michigan

HORNE RAILWAY DEVICES

Horne Double Acting Brakes
Giant Geared Brakes
Differential Staffless Brakes
Sterling Safety Brakes
Sterling Trolley Bases
Sterling Sand Boxes
Air Rectifiers, eliminating frozen air brake piping
Q-P Trolley Catchers
Lord Screenless Air Cleaners for Compressors
Hydrogrounds and Lightning Arresters
Fenders and Wheelguards
Controller Fingers
Friction and Rubber Tape
Packing and Gaskets
Air Hose and Rubber Specialties

HORNE MANUFACTURING CO., 50 Court St., Brooklyn, N. Y.

SEARCHLIGHT SECTION

IMMEDIATE SHIPMENT

1000 K. W. 575 Volt Direct Connected Generating Set

1—1000 KW. General Electric type M.P. form H, 575 volt, 1739 amps. 14 pole generator direct connected to 24 and 48 x 42" McIntosh & Seymour cross compound vertical engine, speed 120 r.p.m.

200 Kilowatt 60 Cycle Rotary Converters

2—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 r.p.m., with starting motors, also transformers if desired.

150 Kilowatt 60 Cycle Rotary Converters

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

150 Kilowatt 25 Cycle Rotary Converters

2—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters. 750 r.p.m., complete with end play and speed limit device.

Transformers

2—375 KVA. General Electric type, 60 cy., 9600 volts prim., 575 v. secy.
3—185 KVA. General Electric, 25 or 60 cy. 19100/33000 volts prim., 430 v. secy.
2—100 KVA. General Electric, 60 cy., 6600 volts prim., 2300 volts secy.
4—100 KW. Westinghouse transformers, oil insulated, single ph., 60 cy., 2300 v. primary, 360 v. secondary.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. primary, 430/362 v. secondary.
3—75 KW. Westinghouse, oil insulated, 60 cycle, 6600 or 13,200 v. primary, 220 v. secondary.

Railway Motors

2—75 to 90 HP. Westinghouse No. 112 Railway Motors, newly rewound, practically new.

IMMEDIATE DELIVERY

ARCHER & BALDWIN

114-118 Liberty Street New York City

TELEPHONE 4337-4338 RECTOR

86 Ton Electric Locomotive

Built by The General Electric Co.

Rating 808-E-172-4GE94-600 V.

Dimensions and Weights:

Length inside knuckles	35' 2"
Length over cab	32' 6"
Height over cab	12' 1"
Width over all	10' 1"
Total wheel base	29' 0"
Rigid wheel base	12' 0"
Track gauge	4' 8½"
Total weight	172,500 lbs.
Weight on drivers	117,200 lbs.
Maximum safe speed	60 MPH.
Minimum radius curvature	150 ft.

EQUIPMENT:

Four G.E.-94 bipolar gearless motors with type M multiple unit control; combined straight and automatic air brake; two 16" electric headlights; air operated bell; whistle; pneumatic sanders, etc.

SPEEDS:

Control equipment is arranged for three economical running speeds; slow for switching service, medium for freight service and high speed for fast freight and passenger service.

MacGovern and Company, Inc.
114 Liberty Street
New York City

CARS FOR SALE

OPEN and CLOSED
MOTOR and TRAIL
Write for Price and Full Particulars to

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg. Philadelphia, Pa.

COMPLETE ARMATURES FOR SALE
FOR ALL THE STANDARD
STREET RAILWAY MOTORS
GET OUR PRICE WE CAN SAVE YOU MONEY
America's Greatest Repair Works
CLEVELAND ARMATURE WORKS, Cleveland, O.

Big Results from Little Ads

The advertisements in the Searchlight Section are constantly bringing together those who buy and sell, rent and lease or exchange. They convert idle commodities into useful cash, idle cash into useful commodities, and that which you have but don't want into that which you want but don't have. The cost is a trifle, the results considerable.

Get your Wants into the Searchlight

SEARCHLIGHT SECTION

FOR SALE

Fare Boxes for Sale

100 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

Equipment for Sale

600 Kw. direct connected a.c. unit, consisting of one Harrisburg cross compound condensing engine; 4 valve; diam. cylinders, 24" and 46"; stroke, 27"; r.p.m., 120; i.h.p., 800; diam. steam pipe, 10"; exhaust, 20"; steam pressure, 145 lbs.; cut-off, 0.29; vacuum, 26".

Generator G. E., type A. T. B., No. 71078, class 60-600-B-120; form E; volts, 11,000; speed, 120 r.p.m.; amperes, 32.

Control panel and oil switch included.

Prompt shipment can be made.

The American Railways Company, Witherspoon Building, Philadelphia, Pa.

Used Railway Motors

Two Westinghouse, No. 12A, 30 H.P., 500 volt, 550 R.P.M., complete with axle brackets and pinions. Bargain. The Electric Railway Improvement Co., Cleveland, Ohio.



Armature Coil Taping Machine

Saves Time, Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

PRACTICALLY NEW

STEEL RAILS 60 lb. A. R. A. Section Series "A." Laid but never used. 4½" high, with angles.

Don't overlook this opportunity to secure New Rails at less than mill cost and for immediate delivery.

CARS

15—Rodgers Ballast, 36 ft., 60,000 Cap. Center Dump—Pass M. C. B. Requirements.

Prompt Shipment—Low price to move quick.

LOCOMOTIVES, CARS, EQUIPMENT, MACHINERY, TANKS, ETC.

Write for 40-page Bargain List.

ZELNICKER
WALTER A. ZELNICKER SUPPLY COMPANY
St. Louis

First Nat'l Bk., Chicago Hennen Bldg., N. Orleans

Main Office: 325 Locust St., St. Louis

What have you to sell?

MISCELLANEOUS

Street Cars Wanted

6 second hand modern street cars, either single truck, double truck or maximum traction truck, for standard gauge track. Cars to have sufficient motor capacity to make 9 miles per hour schedule speed, with six stops per mile, and be able to negotiate ten per cent grades. Give condition, price, location and full information, first letter. Box 1347, Electric Railway Journal, 1570 Old Colony Bldg., Chicago, Ill.

Double Truck Cars Wanted

4 Double Truck, 15 Bench open cars. Brill trucks, no maximum traction trucks wanted. Cars to be equipped with air brakes and Westinghouse 68 motors. Must be in good condition and subject to rigid inspection. Give all details and lowest price in first letter. Address Box 1345, Elec. Ry. Journal.

Accounts Wanted

Being about to organize a Company in the General Railway Supply Business, I would be glad to hear from any one having articles of merit, or specialties that they desire handled or brought to the attention of Steam or Electric Railroads. I only desire accounts on a commission basis and with exclusive, specified territory. Several persons will be associated with me in this Company who have a general acquaintance among the Railroads, both Steam and Electric, throughout the country. Harry T. Bigelow, 934 Peoples Gas Bldg., Chicago, Ill.

POSITIONS WANTED

AVAILABLE for busy executive: Assistant with unusual qualifications and experience. College graduate; Member of Bar. Six years in various executive offices of large railway and lighting company. Now law clerk for legal and claim departments. Can take charge of legal and claim work or other detail. Ability backed by judgment and experience. Box 1223, Elec. Ry. Jour.

DRAFTSMAN, 24, real live young man wishes to connect with growing concern with a view to working up into sales engineering. Six years' experience, designing, mechanical, electrical, technical training, excellent references, at present employed. Box 1350, Elec. Ry. Jour.

ELECTRICAL engineer, technical and practical with 5 years' experience on electric railway equipment, desires position as master mechanic, superintendent motive power or assistant superintendent. First class record and references. Box 1357, Elec. Ry. Jour.

ELECTRICAL engineer, married, 34, 7 years' experience; overhead construction and maintenance; high tension, subway, bonding, electrolysis, signals. Wants position as distribution engineer or superintendent of overhead. References including present employers. Box 1354, Elec. Ry. Jour.

EFFICIENT manager of railway and lighting properties open for engagement. Can put your road on paying basis. Salary, $6,000. Box 1315, Elec. Ry. Jour.

ENGINEER—Manager, 24 years' experience in the construction and operation of electric railway and lighting properties. Experienced in all branches, more especially overhead line construction and power station and sub-station construction, equipment and operation. Now employed, but desires change. Will go anywhere. Box 1343, Elec. Ry. Jour.

POSITIONS WANTED

EXPERIENCED manager of public utilities, light and power, city and interurban railway and gas. Open for engagement. Fine record. Best references. Box 1351, Elec. Ry. Jour.

GENERAL shop foreman of large property desires position as master mechanic of smaller shop. Familiar with both interurban and city equipment. Box 1319, Elec. Ry Jour., 1570 Old Colony Bldg., Chicago, Ill.

MANAGER.—Position as manager of city or interurban electric railway. Eleven years' executive and operating experience in all departments. Full particulars upon request. Box 1349, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MANAGER or superintendent. If your railway property is not paying, drop me a line. I will propose something of interest to you. Box 1352, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MANAGER, desirous change, can handle men successfully. Just pulled one system out of receiver's hands. Young man, married, technical graduate. Box 1348, Electric Railway Journal, 935 Real Estate Trust Bldg., Philadelphia, Pa.

MR. Railway Builder, Owner, Manager—Am superintendent of power company, but want to change to traction or combination. Thirty, married, technical graduate, nine years' experience. Can handle level and transit; have superintended highway work; can handle construction work. Can fill the bill from turning of sod to scheduled operation of system. Need a Live Wire? No lottery number. Write to H. H. Fenton, Blue Rapids, Kan.

PARK Manager, commission or temporary basis. Previous experience guarantees absolute satisfaction. Utilize my advice immediately concerning attractions and concessions necessary to greatest success this year. Box 1334, Elec. Ry. Jour.

POSITIONS VACANT

COMPETENT Electrician-Mechanic for maintenance of three 18 ton BW. mine locomotives and four miles of trolley system. Permanent position to capable man. State age, experience, references and salary. Address Supt. of Transportation, Alaska Gastineau Mining Co., Thane, Alaska.

DRAFTSMAN for master mechanic's office wanted. Must have good electrical and mechanical knowledge and strictly sober. State experience and salary expected. Box 1320, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Phila., Pa.

ENGINEER wanted to act as chief engineer in large central station power house in an Atlantic seaboard city. Must be qualified to take charge of an 80,000 k.w. plant and experienced in handling Curtiss turbines, Jett and surface condensers, and Taylor stokers. Applicant must have experience in large central station plants. State age, experience and salary expected. If employed, give name of company and reason for changing. All replies strictly confidential. Box 1355, Elec. Ry. Jour.

WANTED—A carbarn foreman for eighteen car barn. Massachusetts. Pays twenty-one dollars. State full qualifications with references. Box 1358, Elec. Ry. Jour.

WANTED—A-1 sub-station man who thoroughly understands upkeep of rotary converters, transformers, switchboards, meters, etc., and who can instruct substation men. Good salary and opportunity. Application must state experience and salary expected. Box 1356, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.
If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc., The.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device & Mfg. Co.

Alloys, Steel & Iron.
Titanium Alloy Mfg. Co.

Alloys, and Bearing Metals. (See Bearings and Bearing Metals.)

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Busses.
Brill Co., The J. G.
White Co., The.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Hadfields, Ltd.
National Tube Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
U. S. Metal and Mfg. Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co.
Western Electric Co.
Woodman Mfg. & Supply Co., R.

Bankers and Brokers.
Coal & Iron National Bank.
National City Co.

Batteries, Dry.
Johns-Manville Co., H. W.
Western Electric Co.

Batteries, Storage.
Electric Storage Battery Co.
Western Electric Co.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White.

Bearings, Oil-less, Graphite Bronze and Wood.
Bound Brook Oil-less Bearing Co.

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Hess-Bright Mfg. Co.
Railway Roller Bearing Co

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

Benders, Rail.
Niles-Bement-Pond Co.
Watson-Stillman Co.
Western Electric Co.
Zelnicker Supply Co., W. A.

Blasting Powder & Equipment.
Du Pont de Nemours & Co., E. I.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Boiler Graphite.
Dixon Crucible Co., Joseph.

Boiler Tubes.
National Tube Co.

Boilers.
Babcock & Wilcox Co.

Bond Clips.
Electric Railway Improve. Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improve. Co.
Ohio Brass Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc., The.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Bonds, Soldered.
Horne Mfg. Co.

Bonds, Welded.
Lincoln Bonding Co.

Book Publishers.
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Piling and Lumber.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Creaghead Engrg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
International Creo. & C. Co.
Lindsley Bros. Co.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.

Brake Adjusters.
Holden & White.
Kerschner Co., Inc., W. R.
Smith-Ward Brake Co.

Brake Shoes.
American Brake S. & Fdy. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Taylor Elec. Truck Co.
Wheel Truing Brakeshoe Co.

Brakes, Brake Systems and Brake Parts.
Ackley & Co., G. S.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White.
Horne Mfg. Co.
Long Co., E. G.
National Brake Co.
National Safety Device & Mfg. Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

Brazing. (See Welding.)

Bridges and Buildings.
American Bridge Co.

Brooms, Track, Steel or Rattan.
Patten Co., Paul B.
Western Electric Co.
Zelnicker Supply Co., W. A.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
Dixon Crucible Co., Jos.

Brush Holders.
Anderson Mfg. Co., A. & J. M.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunkers, Coal.
American Bridge Co.

Bushings, Case Hardened Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Bushings, Graphite & Wooden.
Bound Brook Oil-less Bearing Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

Car Stop, Automatic.
Consolidated Car-Heating Co.

Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)

Cars, Dump.
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.
Witt, Peter.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co., Inc., W. R.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Castings, Brass.
Frankel Connector Co.
More-Jones Brass & M. Co.

Castings, Composition or Copper.
Anderson M. Co., A. & J. M.

Castings, Gray Iron and Steel.
American R. S. & Fdry. Co.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hadfields, Ltd.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Electric Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
American Brake S. & Fdry. Co.
Bemis Car Truck Co.
Hadfields, Ltd.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Horne Mfg. Co.
Ohio Brass Co.
Trolley Supply Co.
Union Electric Co.
Wood Co., C. N.

Ceiling, Car.
Pantasote Co., The.

Chargers, Storage Battery.
General Electric Co.

Checks, Employees.
American Railway Supply Co.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors, for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Klein & Sons, M.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.
Western Electric Co.

Cleats, Car Wiring.
General Electric Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Coils, Armature and Field.
Cleveland Armature Works.
Coil Mfg. & Repair Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
American Railways Equipment Co.
Electric Service Supplies Co.
International Register Co.
Johnson Fare Box Co.

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., C. N.



Is YOUR Capital Gathering Cobwebs?

It is if any of it is tied up in old field coils.

We can help you put these coils to work again. Send them to us and let us reconstruct them. We remove the old insulation—clean and anneal the copper—then reinsulate it with

SALAMANDER PURE ASBESTOS

which is, in itself, a guarantee against carbonization due to age and breakdown under overload. We then rewind the wire into new coils having just the same characteristics as the old ones.

It's *better* than selling your old coils—and *cheaper* than buying new ones, for our only charge is for the actual insulation used. Ask us to demonstrate the economy of our method.

Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

For General Testing

in Electric Power Plants, or for Outdoor Work

Weston

Model 45

D. C. Portable Ammeters and Voltmeters



Designed to meet the demand for a medium priced Ammeter and Voltmeter. Their accuracy is guaranteed within 1 per cent.

They are shielded from the influence of external magnetic fields, the movement and magnetic system being enclosed in an iron case permanently mounted in a handsome wooden carrying-box with hinged cover.

The scale has a mirror over which the knife-edge pointer travels. Readings can be made within 1/10 of a division at any part of the scale.

In mechanical and electrical workmanship the Weston Model 45 Portable Ammeters and Voltmeters practically attain perfection.

A full description will be found in Bulletin 501, which will be mailed to you on request.

Weston Electrical Instrument Co.

21 Weston Ave., Newark, N. J.

New York	Chicago	Detroit	St. Louis	Montreal
Boston	Buffalo	Pittsburgh	Toronto	Florence
Philadelphia	Cleveland	Denver	Winnipeg	Paris
Richmond	Cincinnati	San Francisco	Vancouver	London

The Baldwin Locomotive Works

Philadelphia, Pa.

ELECTRIC MOTOR and TRAILER TRUCKS



Samson Bell and Register Cord

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

SAMSON CORDAGE WORKS BOSTON, MASS. 2

VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.

2325 So. Pauling St., Chicago, Ill.

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago Washington, D. C.

RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels

Special Agents for { Tool Steel Gear & Pinion Co. / Johnson Fare Box Co. / C. & C. Electric & Mfg. Co. / Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cameron Elec'l Mfg. Co.
Cleveland Armature Works.
Coil Mfg. & Repair Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
Mica Insulator Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air.
General Electric Co.
Westinghouse Trac. Brake Co.

Condensers.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduit, Flexible.
Tubular Woven Fabric Co.
Western Electric Co.

Conduits, Underground.
Johns-Manville Co., H. W.
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Colfax Avenue, Benton Harbor, Michigan. Brick (Pitch Filled) on old macadam base

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New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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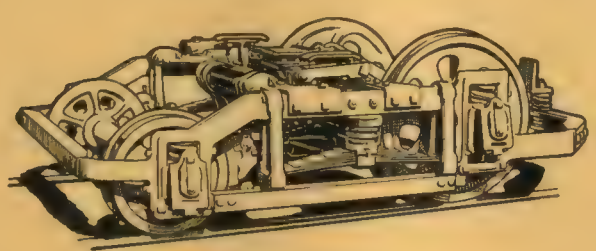
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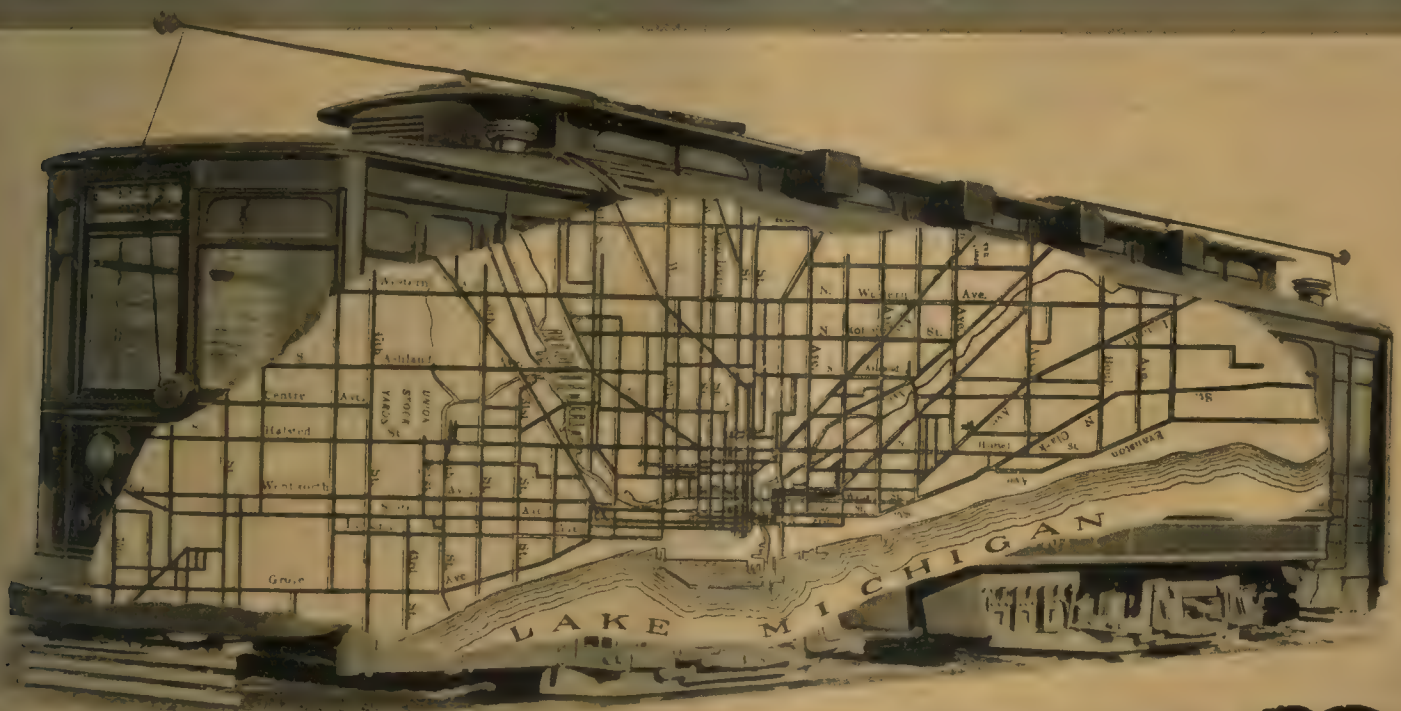
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Articles on Overhead Construction

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VOLUME XLIX, No. 6 NEW YORK, FEBRUARY 10, 1917 PAGES 237 TO 278

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The Westinghouse Inspector-Specialist saw at a glance what was wrong and pointed it out, saying: "The piping is wrong. They did not follow the blue print. The main reservoir pipe is connected to the brake cylinder port of the triple valve. Correct that error and put the car on it's run."



The Message from the Car Barn

"Yes, Mr. President, thanks to that Westinghouse Inspector-Specialist, we have all of those ten new cars in service earning nickels. We're handling a record holiday crowd and cleaning up corners at every stop. We made a slip-up in the piping. He set us right—came 500 miles on our wire at his own expense—made no kick, even though the fault was ours."



Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

PITTSBURGH:
Westinghouse Building

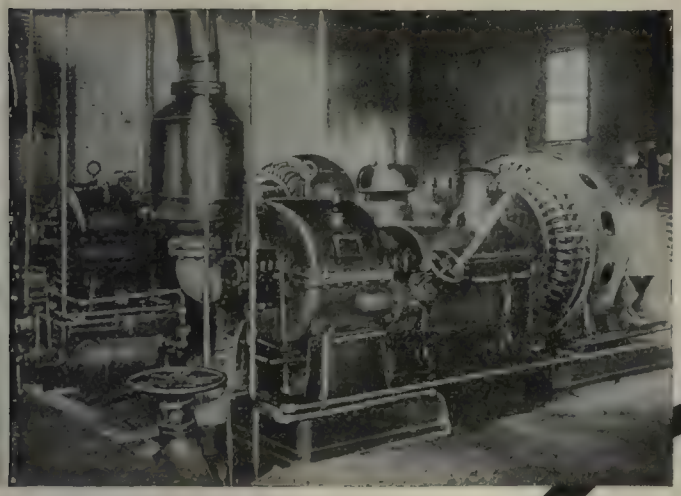
CHICAGO:
Railway Exchange Building

TRADE MARK

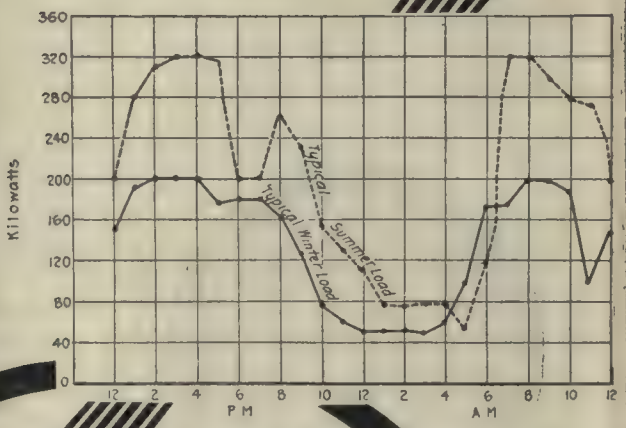
NEW YORK:
City Investing Building

ST. LOUIS:
Boatmen's Bank Building

Extraordinary Economies



Two 300 kw. Westinghouse Geared Units. Hoopeston (Ill.) Gas & Electric Co.



Typical Summer and Winter Loads carried by the Hoopeston, (Ill.) plant.

Westinghouse Geared Turbines

(See the July 8, 1916 Electrical World for a description of this plant.)

During the summer canning season, the two 300 kw. Westinghouse Geared Units in the Hoopeston plant operate between ¾ and full load, and during the winter between ¼ and ½ load.

The seasonal variations, as well as the extreme fluctuations in the daily load, are handled nicely by these Geared Units which secure economies at the lighter loads practically as good as those at full-load capacity.

Write for Leaflets 3869 and 3870.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

W WESTINGHOUSE ELECTRIC

at a Poor Load Factor



For Your Own Protection



Type Z B
For City Service



Type W D S
For City and Suburban Service

It is worth while to equip your city cars with good Headlights. Not necessarily powerful ones, but headlights which will make the motorman independent of street lights in the outlying parts of the city and which serve warning of the car's approach.

Crouse-Hinds Imperial City Service Headlights are real headlights.

They have metal parabolic reflectors which are very efficient.

City and suburban types may be furnished with reflectors for Crystal Ray (most efficient), Gold Ray (yellow light), Sterling Ray (white light).

Either type is made with plain, guard or grid door and for surface or flush mounting.

Cases are made of either cast iron or pressed steel with abundant strength for the most severe service.

Besides Crouse-Hinds Imperial Headlights for city, and city and suburban services, there are high-powered Incandescents, Luminous Arcs and Carbon Arcs for high speed work. For information on any kind of headlight address

The Ohio Brass Co.

Mansfield, Ohio

General Sales Agents in U. S. for Crouse-Hinds Imperial Headlights



Another Victory for Electricity

Electricity has come into its own on the mountain divisions of the Chicago, Milwaukee & St. Paul.

Fresh stimulus has been given to the Electric Railway industry by this latest success. And it gives a glimpse of the broad prospect ahead of the men who have identified themselves with this smooth, clean, rapid, modern mode of transportation.

It is worthy of remark that O-B Catenary Materials, Hi-Tension Insulators and Rail Bonds were used on a considerable portion of the C., M. & St. P.

O-B Catenary Material is giving the same good service on scores of other roads.

O-B Engineers with their complete knowledge and broad experience are at your disposal as a part of O-B Service.

The Ohio Brass Co.

Mansfield, Ohio



Phono-Electric

has made good since 1908 on the New Haven Line

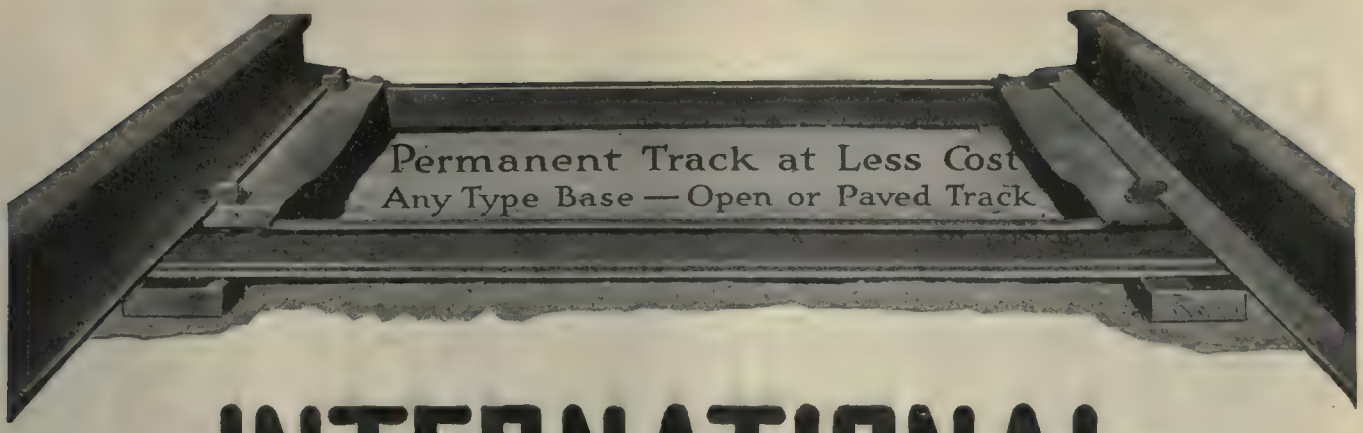
In 1908 the New Haven Railroad put up its first No. 0000 Phono-Electric between Larchmont and Portchester.

The Phono-Electric contact wires you see in the picture are the same wires that were put up in 1908!

You know that the great 11,000-volt electrification of the New Haven Railroad calls for safe, uninterrupted service.

Isn't a record like this—with years of usefulness still ahead—worth your attention as a progressive operator?

Bridgeport Brass Company, Bridgeport, Conn.



INTERNATIONAL
STEEL TWIN TIES

Are no longer a luxury—but a necessity

Now-a-days you cannot afford to install wooden ties in paved streets—even with the present price of steel.

No matter how good the quality of wood tie—or how it is preserved—renewals will be necessary some time.

Steel ties in concrete become a permanent investment. When the rail is worn out it can be renewed without disturbing the foundation. And the first cost is as cheap as any other type of construction which can be built according to accepted engineering principles.

International Steel Twin Ties have so simplified concrete track construction and so reduced the cost of installation that they are within the range of any company's pocketbook.

Furthermore, if occasion should arise to take up the foundations your steel ties have a scrap value—an item well worth considering.

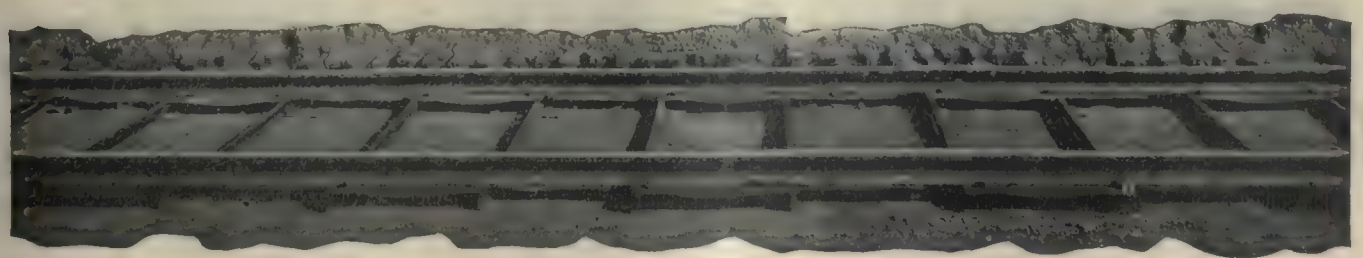
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal. San Francisco, Cal. Seattle, Wash.
R. J. Cooper Co., Salt Lake City, Utah.
J. E. Lewis & Co., Dallas, Texas.
Maurice Joy, Philadelphia.
William H. Ziegler, Minneapolis, Minn.



8-Hour Service
On Orders for
CHESTNUT POLES

Six big yards, stocking thousands and thousands of chestnut poles, served by locomotive cranes for loading, with a big organization for handling your order, are ready to give you immediate delivery.

Isn't there a feeling of security in knowing that no matter how big or little the emergency you can always get strong, durable Paducah chestnut poles with the minimum delay?

Chestnut is nature's pole and there are millions of them. You can get them when you want them and they cost less. Write, wire or phone your order. The poles will be shipped at once.

Yes, we can give you open tank treatment if you want it.

Yards

Paducah, Ky., Metropolis, Ill., Dividing Ridge, Ky., Bonnieville, Ky., Munfordville, Ky. Mansfield, Tenn.

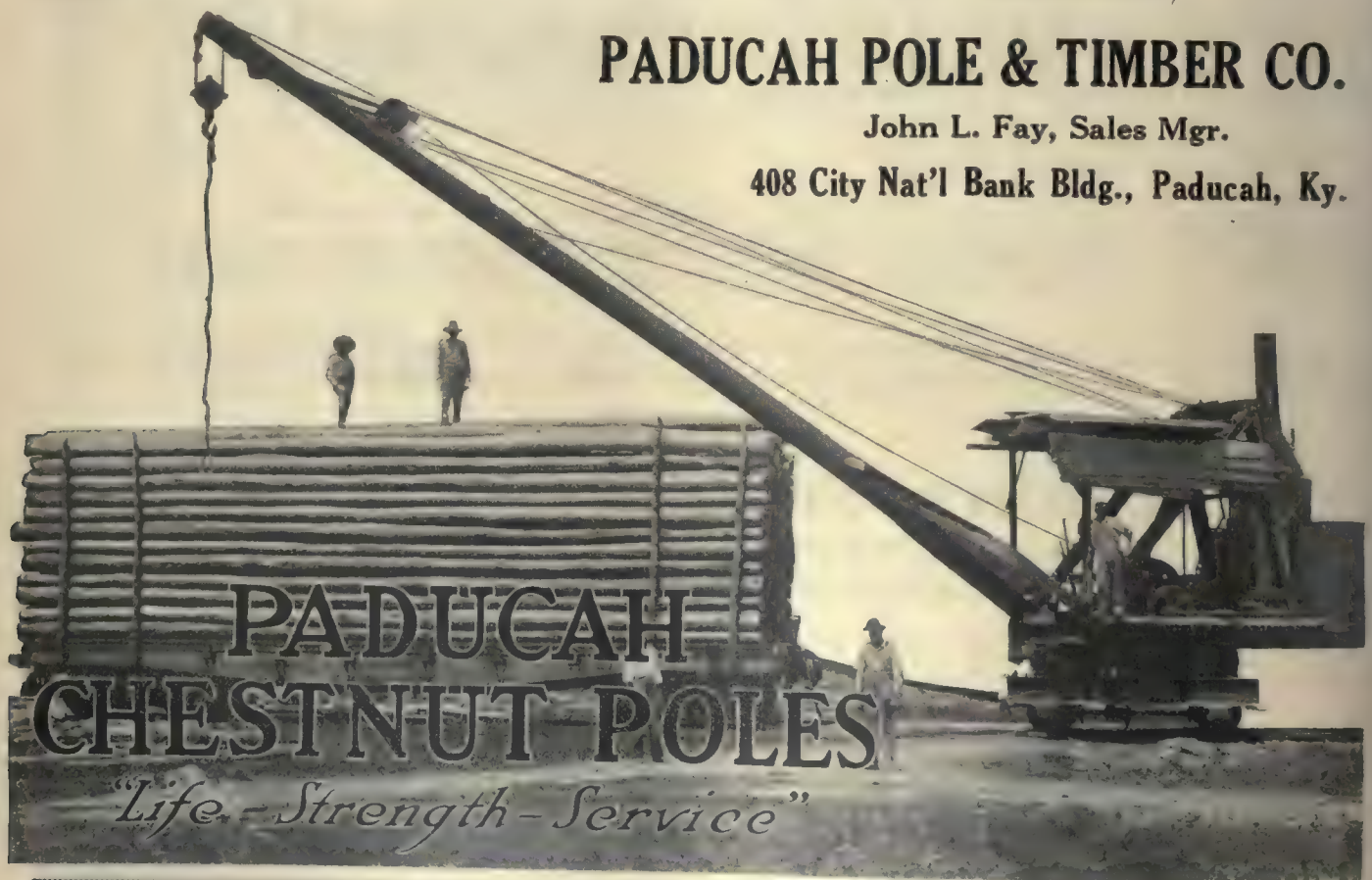
Producers of

Chestnut poles, cypress and longleaf yellow pine cross arms, piling, bridge timbers, red cedar posts and lumber.

PADUCAH POLE & TIMBER CO.

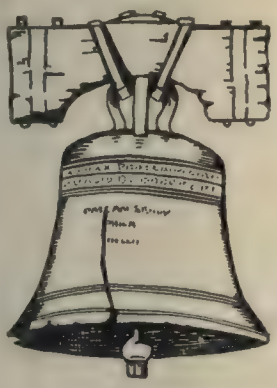
John L. Fay, Sales Mgr.

408 City Nat'l Bank Bldg., Paducah, Ky.

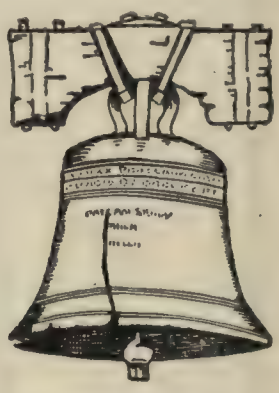




A TWO-CAR LIMITED TRAIN ON THE LIBERTY-BELL ROUTE OF THE LEHIGH VALLEY TRANSIT COMPANY



Keystone Gear Cases



on the Route of the Liberty Bell

Well designed inter-urban cars *don't* have to carry a lot of dead weight to permit easy riding.

That's one reason why the light Keystone Sheet Steel Gear Cases are used on the magnificent high-speed cars of the Lehigh Valley Transit Company's Liberty Bell Route, Allentown to Philadelphia.



Typical Keystone Steel Gear Case

There are many other reasons, too. For instance, a construction that prevents dirt, dust and water from getting at the gears in spite of high-speed, cross-country operation.

Follow the Route of the Liberty Bell

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.

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PHILADELPHIA HOLDING COMPANY
FORGED STEEL BUILT UP
DOUBLE TRUCKS & HALSEY RADIAL TRUCKS
FOR ALL CLASSES OF SERVICE
505 CHESTNUT STREET
BELL PHONE LOMBARD 1914

PHILADELPHIA, Jan. 25th, 1917

Mr. Walter Jackson, Business Manager,
Electric Railway Journal,
239 W. 39th St., N. Y.

Dear Mr. Jackson:-

Mr. Duntz, the superintendent of the Fishkill Electric Railway Company came into our office one day with one of our advertisements that he had cut out of the Journal. He wished to be informed regarding the truck and upon leaving asked me to be at Beacon early the next week. I went there and the order was closed for four trucks.

Yours very truly,

JRDickey

Electric Railway Journal
Member Audit Bureau of Circulations

Widely Used in the South, North, East and West

Northern White Cedar Poles



Pole Line of Louisville Gas & Electric Co. Louisville, Ky.

Built of Northern White Cedar Poles

This pole line is one of the sturdy, attractive lines of NORTHERN WHITE CEDAR POLES in Louisville, Kentucky. It is located in a residence district, on Ormsby Avenue between 5th and 6th Streets.

The pole in the foreground carries 11½ arc circuits, 3 single-phase lighting circuits and 1 power 2-phase circuit with 110 volts, secondary #6 wire. The pole was installed in August, 1905, and is in good condition at the present time.

NORTHERN WHITE CEDAR POLES are extensively used in sections of the country very near the producing districts of other pole timbers. This is an evidence of the advantages NORTHERN WHITE CEDAR POLES possess over other woods and other materials used for pole purposes.

NORTHERN WHITE CEDAR POLES set twenty years ago are in good condition at this time—capable of years more of service.

Northern White Cedar Association

Lumber Exchange—Minneapolis, Minn.


COLLIER SERVICE
YOU
are cordially
INVITED
to INSPECT
our
NEW
CENTRAL
PLANT
CANDLER
BUILDING
220 W. 42nd. St.
NEW YORK CITY
CAR
ADVERTISING
ALMOST
EVERYWHERE
Barron G. Collier
INCORPORATED



Showing the typical condition of a steel pole after being in service 7 years. Corrosion has weakened the pole to such an extent that overhead is unsafe, and immediate action required.



View of same pole, with Drew Protective and Reclaiming Pole Sleeve in place preparatory to doing the simple concrete work. Note how the heavy ribbed sleeve reinforces and covers the weakened portion.



View of the same pole as above after Drew Pole Sleeve had been put in place and job completed, thereby giving this pole that would have required replacement, *at least 15 years of additional service.*

No user of steel poles can afford to ignore the savings so easily made by Drew Pole Sleeves

You can make any steel pole weakened at the ground line better than new at less than one-fifth the cost.

More than 300 roads are using this device to reduce pole cost—an especially vital feature now, when materials and labor may become even more scarce and costly, and when the utmost operating efficiency and economy are so urgent.

Even when the pole becomes paper thin, often after it has broken off completely, it can be kept in service—made stronger than when new.

Wherever you have a steel pole, you have an opportunity to make this saving, that obviates purchasing new poles, heavy labor cost for installation and expensive disturbance of existing overhead.

Prepare Now for Your Spring Campaign

Ordering Drew Protective and Reclaiming Pole Sleeves now—is splendid service insurance. You can install them any time—preferably in the warmer months for convenience—but any time through necessity. By anticipating your requirements you protect yourself on delivery. Place your order now at present prices for deferred shipment.

Send for illustrated data that every overhead man should have

We have prepared an illustrated booklet—based on photographs secured in routine installation. The pictures tell you the story. Ask for the booklet, it is sent free.

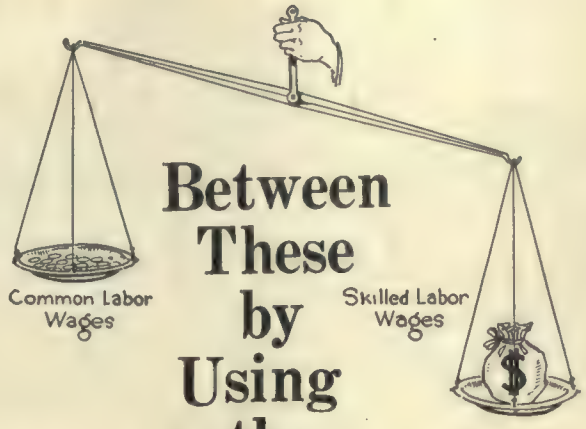
Drew Electric & Mfg. Co.

Office and Works, Indianapolis, Ind.

District Representatives in Principal Cities

DREW OVERHEAD LINE MATERIAL IS STANDARD ON KEENLY MANAGED ROADS. GET QUOTATIONS

You Save the Big Difference



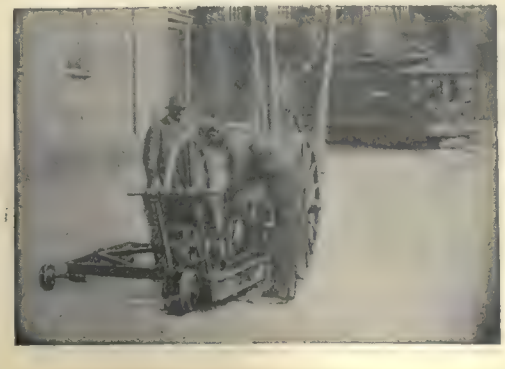
Reciprocating Track Grinder

Furthermore, you get more work done in less time. And without any danger of grinding away more of the wearing surface of the rail than is necessary to completely eliminate "cups" or "corrugations."

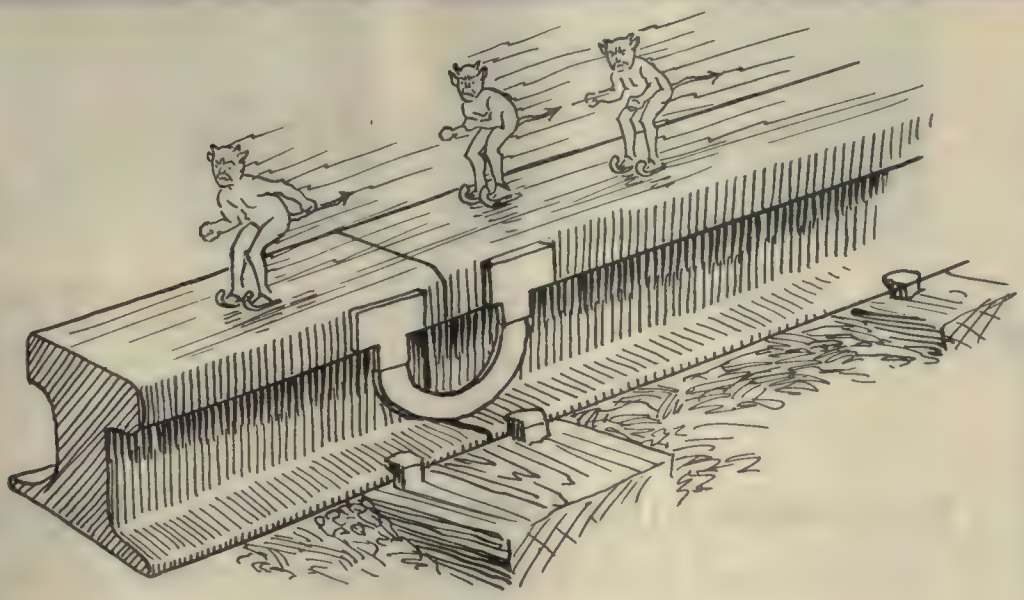
It is perfectly obvious that under any method of grinding in which a rotating emery wheel is used with a comparatively small bearing surface that it is necessary to maintain exact adjustments in order to remove the bad spot without grinding away, and therefore wasting, an unnecessary amount of the rail head.

Such continual adjustments must necessarily be made by skillful workmen who possess training and judgment.

The straight flat bearing of the Reciprocating Grinder not only eliminates all necessity for such adjustments and insures an accurate result, but as it brings 18 inches of material into bearing, which is increased by its 5-inch stroke to 23 inches, it does the work much more rapidly.



The Railway Track-work Co.
30th and Walnut Streets, Philadelphia, Pa.



Coming Home

Don't make your current use up its energy in getting back to the power house. It will do more work in your motors if it has good sledding on the return circuit.

ERICO
Welded Rail Bonds

make it easy for the current to get by the rail joints. They are actually welded to the rails and give a full 8 to 1 contact ratio.

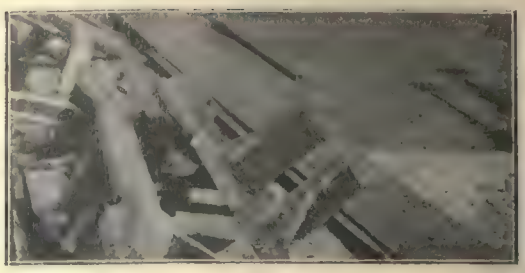


The Electric Railway Improvement Co.

Cleveland, Ohio



Track Repairs
Harrisburg, Pa.
Worn Manganese Steel Crossover repaired with Lincoln Arc Welder.



Shop Welding
Dayton, Ohio
Car truck frame repaired with the Lincoln Arc Welder.

You can do either kind of welding work and do it at lower cost than by any other method if you use

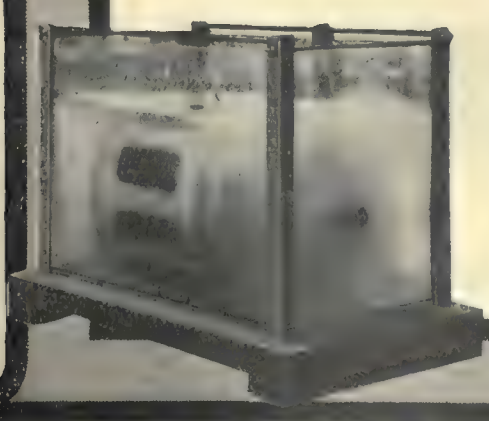
Lincoln Arc Welders

The principle of operation is simple and safe.

The current from the line is used to run a motor, which in turn drives a generator delivering current at just the right voltage for welding. Only 7 to 8 K.W. power is taken from the line.

It is **possible** to weld by reducing the line voltage—passing the current through a cast iron resistance which consumes or wastes the **extra** power. This method demands 80 to 100 K.W. and is neither economical or safe.

The Lincoln Arc Welder saves 70 to 90 K.W. in power. Investigate



The Lincoln Electric Co.

Cleveland, Ohio

New York City (Singer Bldg.)	Chicago	Philadelphia
Buffalo	Columbus	Pittsburgh
Syracuse	Detroit	Charlotte, N. C.
	Grand Rapids	Toronto, Canada

Agencies in other principal cities.

1760 Sets of
National Manual Control
Ordered for 440 Cars of
New York Railways Company

The New York Railways has just placed with the National Pneumatic Company an order for **National Manual Ball-Bearing Door and Step Control** to go on 440 cars which will be converted to the full-vestibule type.

This control will be used in connection with double-shaft, four-leaf folding doors and three-arm folding step at the entrances or conductor's corners, and with single-shaft, two-leaf folding doors and two-arm folding step at the exits or motorman's corners.

To secure maximum entrance and exit clearance, the control stand will be so designed that the fare box can be set directly in front of the conductor and above the operating handle.

Also, to make it natural for the motorman to close the door before starting the car, the door-operating handle will be placed on the left-hand side and back of the controller.

The New York Railways' Order
Makes a Total of More Than 1250 New York City Cars
Equipped or to Be Equipped with
NATIONAL MANUAL CONTROL

NATIONAL PNEUMATIC COMPANY

50 Church St. New York 515 Laflin St. Chicago



PETER SMITH HEATERS

Were Selected for Syracuse's Latest Cars



Syracusans have a right to consider themselves the salt of the earth, although they no longer dig for it in or near the business district!

Lately the New York State Railways bought twenty-five Peter Witt pay-leave cars for Syracuse and ten more for the neighboring city of Utica. They knew that their public wanted the best in heaters, so they ordered

Peter Smith 2P Hot-air Forced Ventilation Heaters

for every one of these up-to-the-minute, quick-loading cars.

The winter winds of Central New York can blow as hard as they like now, but the riders in these Car Rider's Cars will certainly be cozy.

Peter Smith Heating Equipment

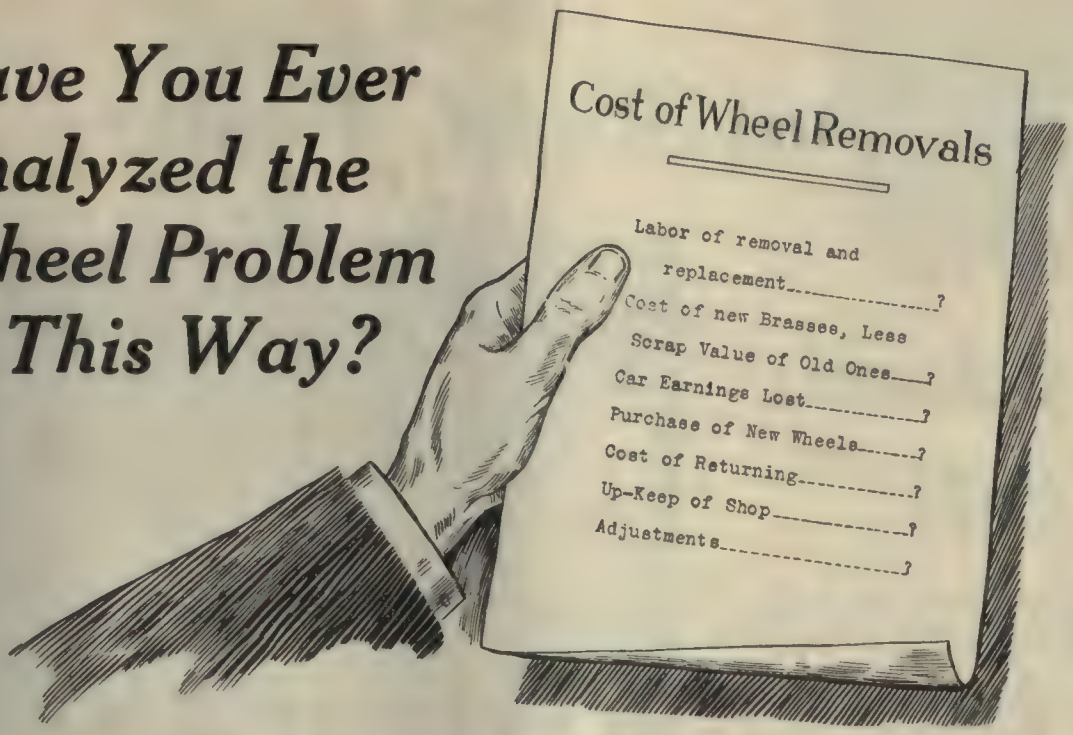
will make your winter service attractive, too—and by making it attractive you will gather more fares and more public satisfaction!

PS HEATERS

The Peter Smith Heater Co.
Detroit, Mich.
Heater Specialists for Thirty-five Years

PS HEATERS

Have You Ever Analyzed the Wheel Problem In This Way?



The cast-iron wheel does not provide maximum safety and economy under electric railway equipment.

The wrought steel wheel cannot be made with the hard tread and flange of the chilled-iron wheel, but must be turned down once or twice to give its full mileage.

There are about three-quarter million wheels in use on the electric railways of the United States.

To provide facilities for turning this number of wheels means an enormous investment in shops, lathes and other necessary equipment, as well as a large increase in the number of machinists employed.

It also means that your equipment is out of service a considerable time while wheels are being changed.

The reduced diameter of a turned wheel causes the trouble and expense of adjusting motor clearances. In most cases to do this it is necessary to take the truck from under the car. This involves more labor and expense.

In addition it is usually necessary to replace the partially worn brasses in order that uniformity may be maintained.

What is the solution?

DAVIS STEEL WHEEL

One Wear — Manganese Tread

The Davis Steel Wheel retains the advantages of the cast-iron wheel—a hardened tread and flange, a soft, ductile steel plate and hub and a one-wear construction.

It avoids the disadvantages of the wrought-steel wheel, such as expensive turnings, adjustment of motor clearances, the expense of replacing partly worn brasses, and the maintenance of expensive shop equipment.

The Davis Wheel offers positive relief from the expense and trouble of removing wrought-steel, multiple-wear Wheels.

Write for Data

American Steel Foundries

1101 McCORMICK BUILDING CHICAGO, ILL.





THAT "Just Right" Feature about Columbia Coils

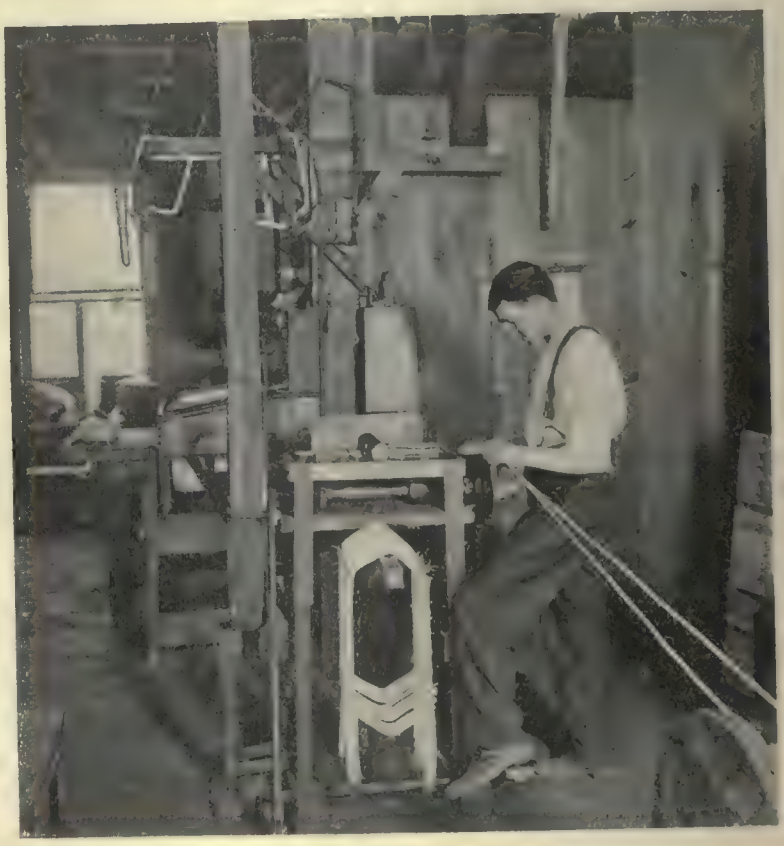
is not a temporary increase in care and quality to gain your patronage.

It is a feature that has been characteristic of Columbia Coils for a generation.

Columbia Coils must have made good over many years; else our business would not show unfailing growth year after year.

We are simply determined to give you the best material, the best workmanship and the best price.

That principle holds good all along the line—whether in tools or materials.



Columbia Coils Are Made Just Right

TOOLS

Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels





Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco



183 Rico Coasting Recorders in use by the Northern Texas Traction Company

Before the advent in 1914 of the Rico Coasting Recorder on the cars of the Northern Texas Traction Company (Fort Worth, Dallas, Tarrant County, etc.), energy consumption averaged 3.07 Kw.-hours per car mile. Since the installation of the Rico Coasting Recorder, energy consumption has been reduced so materially that it now (Sept., 1916) averages 2.33 Kw.-hours per car mile under the very same operating conditions.



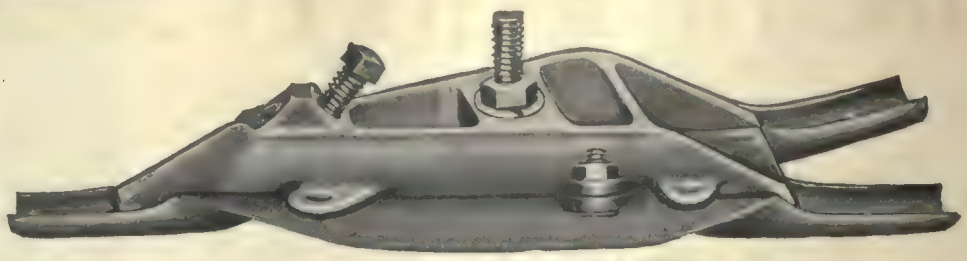
That the Stone & Webster Management Association believes the Rico Coasting Recorder embodies

The True Principle for Measuring Operating Efficiency

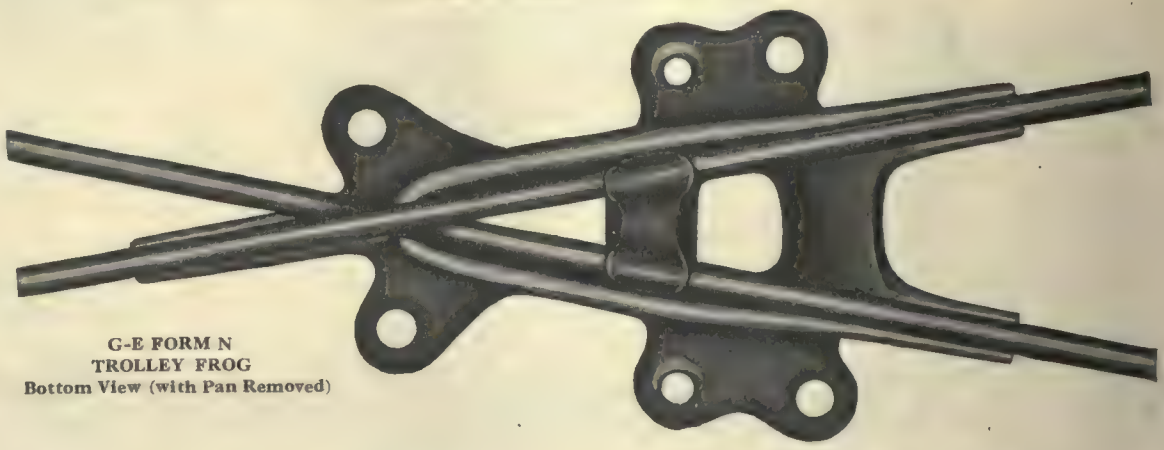
is attested abundantly by its decision to equip its Houston (and Galveston) properties with Rico Recorders because of the savings and betterments they had permitted on the Northern Texas lines.

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



G-E FORM N TROLLEY FROG—SIDE VIEW



G-E FORM N
TROLLEY FROG
Bottom View (with Pan Removed)

The G-E Trolley Frog has a renewable pan

The form N trolley frog, when once located and the wires fastened into position, requires no further handling of wires and tackle. The body is permanently wired in place and only the pan, which is bolted to the body, need be renewed when worn.

A branch wire may be run through this frog and a guy wire attached to it, or the wire may be dead-ended in the clamp as desired. The frog is made in several styles (15° turnout) as follows:

Catalog No. 200293.....All iron frog (right hand)
Catalog No. 200291.....All iron frog (left hand)
Catalog No. 200294.....Iron body, brass pan (right hand)
Catalog No. 200292.....Iron body, brass pan (left hand)

Ask our nearest office for sample

General Electric Company

General Office: Schenectady, N.Y.

ADDRESS NEAREST CITY

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
*Dallas, Tex.
Dayton, Ohio
Denver, Colo.
†Detroit, Mich.
Des Moines, Iowa
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
*El Paso, Tex.
Fort Wayne, Ind.
Hartford, Conn.
*Houston, Tex.
Indianapolis, Ind.
Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.
Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y
Niagara Falls, N. Y.
*Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio

*Southwest General Electric Company. †General Electric Company of Michigan
For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.
GENERAL FOREIGN SALES OFFICES, Schenectady, N. Y.; 30 Church St., New York City; 83 Cannon St., London, E. C., England 6459

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BOSTON AND THE MID-YEAR MEETING

Boston is a particularly appropriate place for the meeting of the American Electric Railway Association which will be held there next Friday. In that city and vicinity are being threshed out some of the most important financial problems of the industry. During the few years just past the Boston Electric Railway and the Bay State Street Railway have faced some very difficult situations. They have, while trying on one hand to control expenses at the same time furnishing adequate service, endeavored to impress on the public the necessity for financial relief. Of course, these conditions are confronted in many other communities but they are peculiarly acute in Boston now. Fortunately the local regulative authorities appreciate in a large degree the strenuous nature of the task before the railway managers and are affording some measure of relief. An example is the finding, abstracted elsewhere in this issue, of the special commission appointed by the legislature to consider the Elevated situation. This commission has endeavored to find ways of ameliorating conditions for the company without increasing the rate of fare. The result is encouraging as an augury of future additional relief. In view of the sympathetic attitude of the authorities the fact that representatives of the Commonwealth of Massachusetts and the City of Boston will speak at the meeting adds to the interest of the occasion. The diplomatic crisis which shadows all individuals and gatherings throughout the country will also tend to render this a most impressive meeting.

THE ELECTRIC RAILWAYS' SHARE IN WAR

Now that a definite possibility of war confronts the nation it is natural that each red-blooded individual and organization should turn to consideration of how best to "do his bit." For the electric railway industry as a whole the character of the "bit" is perhaps most readily outlined by an explanation of what the American Electric Railway Association has in hand, and the duties of the railways are happily covered with the admonition merely to co-operate promptly with the simple plan that is now under way. A telegram from General George H. Harries, printed on page 249 of this issue, tells how the electric railways can assist the government to the best advantage. In brief, the association has appointed a committee whose members are assigned to districts embracing the whole of the Atlantic and Pacific coasts. Each committeeman is to prepare a complete map of electric railways within his district marked to show the physical characteristics of each property and its equipment. This will indicate at a glance such details as width of gage, wheel-flange dimensions, height and type of couplers, maximum clearance lines, actual and possible physical connections with steam railroads, and other information regarding the possibility of using any line for through routing of troops and munitions. When all coastal districts have been completely mapped (and this should take but a short time with proper co-operation) attention will be turned to the interior railways, and there will be available for the War Department a comprehensive enumeration of all facilities that exist in the electric railway field. These facilities, as well as everything else in war time, may be requisitioned by the government, and the government will, with the new map, be in position to pick out that which it can use to best advantage. Here, at least, is a definite duty for the electric railway industry to perform. When the requests for data from the district committeemen are received it is up to each company to answer and to answer at once. After that, all that needs to be done is to obey orders.

ADVERTISING IN RAILWAY COMPANY PUBLICATIONS

A notice in the monthly just started by the Georgia Railway & Power Company for distribution among employees, officers and owners is headed "No Space for Sale Here." The announcement then goes on to say that even if the King of England or the Emperor of Germany were to beg until tears rolled down their cheeks for advertising space in the publication, they couldn't buy so much as half an inch of a single column. "Our space is not for sale to anybody for any purpose. No, sir!" says the company. We are glad to see this clear-cut statement. Sentiment on the ethics as well as the business policy which should govern electric railway companies in soliciting advertising for their publications seems to be consolidating. Four prominent managers wrote us letters which appeared in our issues of Jan. 13 and Jan. 20 indorsing the position which we took in our issue of Jan. 6, condemning on ethical grounds all solicitation of advertising by a railway company from manufacturers who hope to do business with it. A letter from another prominent manager, just received, says: "I object to that form of graft very strenuously." We believe that many others agree with him. There is no such thing as "honest graft." The excuse that the plan is not ideal but "we need the money" is equivalent to a confession of the impropriety —to use no stronger word—of the whole proceeding. We have not criticised the solicitation of advertising from local merchants for company publications, simply from concerns with which the company is doing business or may do business in the future. Nevertheless, we are glad to see that no advertising of any kind is

carried in the two company publications beginning during the past two weeks, namely the Atlanta paper just mentioned and that of the Public Service Corporation of New Jersey.

INTERURBAN FINANCIAL REPORTS

Mr. Doolittle has presented to the industry this week, in his second article on interurban railways, a valuable compilation of interurban financial data. In addition, he has showed in a clear way the question that must be answered in order to ascertain the causes of the present showing and to find what, if any, remedy is needed. He has, therefore, treated our readers to more than is required by the primary subject, the anatomy of the interurban report, for this means simply a dissection or study of the structure of such a report. The advanced material we shall pass over with the comment that it is well worth the serious consideration of electric railway officials. We now desire to emphasize simply one point—that the structure of most interurban financial reports is queer. Mr. Doolittle in kindness has presented a sort of composite anatomical picture, made up from various sources, so that the deformities of particular reports are not visible. That these exist, however, is uncontrovertible. Some annual reports seem nothing more than a skeleton with scarcely a backbone left. In other words, they consist of only an abridged income statement and a balance sheet, often distorted from their proper official form, and carrying with them none of the other parts and general information that go to make up a well-rounded flesh-and-blood report. This applies, of course, to reports of city railway companies as well as to those of interurban lines, for electric railways as a whole fail to pay sufficient attention to the structure of these statements. Mr. Doolittle's present article mentions various points that ought to be answerable from a report. It will be a good test of the proper structure of yours. Try it.

KEEPING THE TRACKS CLEAR

Street car tracks were not laid for trucks, automobiles and other vehicles, in spite of what the unsophisticated backwoodsman might think if he watched the traffic on an ordinary city thoroughfare for a few minutes. It is difficult, however, to make the public take seriously any plea of the railways for an unrestricted use of their own facilities. The reason for this is that the average man, even when he is a passenger on a delayed electric car, does not visualize the conditions from the electric railway standpoint. He is much more apt to assume that the company is to blame because the cars are not going faster than to realize that every blockade of the tracks is a source of expense to the company in useless car-hours.

For these reasons, municipal authorities and public representatives would render an important service to all if they would help to bring this point more closely home to the public. An excellent example of public-spirited work along this line is the recent survey initiated by the Chicago *Herald* for the sole purpose of explaining to the public the real causes of car delays. The causes ascertained by ordinary reportorial diligence—*i.e.*, both an unnecessary usurpation of the car tracks by vehicular drivers and a forced use of such because of automobiles parked at curbs—are not new to our readers, but we wish to commend the enterprise with which they have been brought emphatically to the attention of Chicago citizens.

The problem involved is one, of course, that is up for solution not only in Chicago but also in other cities. The daily service reports of the Detroit lines, for example, are "alive" with instances of delays due to vehicular traffic, and the New York Railways has just issued a bulletin to show traffic conditions in the metropolis. In fact, never before has the subject of relief from traffic congestion in our larger cities required such urgent attention as at this time. The problem has been complicated, as the Chicago *Herald* intimates, by the enormous increase in the number of automobiles. New York City, for example, showed an increase in 1916 as compared to 1915 of from 86,000 to 116,000 pleasure automobiles and from 14,000 to 21,000 commercial motor vehicles. The automobile invasion has been particularly demoralizing in this city, where streets are already blocked with building operations, subway and pipe-line construction and repaving. Another complication, not so general, is the blockading of tracks after heavy snowstorms, for shortage in the municipal snow-fighting forces has resulted in automobiles and trucks taking advantage of tracks cleaned by the street railway's snow plows. Such a practice, for instance, after one recent storm was largely responsible for a 25 per cent reduction in the New York Railway's daily car mileage.

The alleviation of traffic congestion is a difficult task, but many are the suggestions as to the proper method to be used. Some proposals, such as widening streets by reducing the width of sidewalks in order to provide for two streams of vehicle traffic in the same direction outside car tracks, etc., need mature consideration owing to the expense involved. Other suggestions are more practicable. For example, one desirable improvement which could be widely and easily adopted, would be to increase the number of sections on important streets to be forbidden as parking places during rush hours. Vehicles at these points should not be allowed to stop longer than to discharge or take on passengers. Parking privileges limited to a short period, such as half an hour, are inadvisable because the duration of the privilege is likely to be abused. Street car operation could also be accelerated by closing crowded streets to trucks during rush hours. Moreover, co-operation between traffic officers in moving traffic in unison and the further adoption of the semaphore system of control, as on Fifth Avenue, New York, might be secured, although the latter practice is opposed by the Milwaukee police commissioner on the ground that traffic might be blocked if the officer left his post in case of an accident or other emergency.

Whatever one of these or other plans is adopted, however, it seems logical to place the business of traffic regulation in the hands of an expert body appointed

solely for the purpose of devising and considering plans to relieve congestion and enforcing these by means of co-ordination between the various city departments. The Chicago Traction and Subway Commission, the recently established Des Moines traffic bureau, and the traffic commission just proposed by Police Commissioner Woods of New York—these are good examples of the special traffic commission or bureau that it would seem advisable for each large city to appoint. Such a body, even more than an important newspaper, can give the desired stamp of authority to the genuineness of the railway burden.

APPLYING THE PRINCIPLES OF PUBLICITY

A friendly critic has directed our attention to the close parallel which exists between the service which the JOURNAL is giving and aims to give, and that which a public utility gives and aims to give. He suggests that undoubtedly many of the adverse financial conditions existing in the electric railway field at present, such as a stationary basis for receipts with increased cost of operation, must apply to the publishing business as well, that the cost of the improvement in service to its constituency during the past ten or twenty years, which he considers has been as marked in the case of this paper as with the electric railways, has further increased the expenses, and that in many other ways a close parallel exists. He goes on to say that the JOURNAL has long been urging the electric railways to use publicity to develop a spirit of co-operation between the public and themselves and that it is about time that we should "take our own medicine." We recognize the parallel and acknowledge the impeachment.

We believe that the first obligation of a newspaper like that of a public utility is service to its public, to quote Clause I of the Code of Principles adopted by the American Electric Railway Association at Atlantic City in 1914. In fact, most if not all of the articles in this code apply to newspapers just as well as to electric railways. Like the utility, the technical paper is bound to succeed or to fail on the basis of the service which it renders to its field. The obvious corollary to this, both in the railway business and in journals, is that co-operation on the part of the public served is necessary to good service. This, then, is the purpose of this editorial, namely, to take the advice which has been offered to us to say something about our policies and to ask, as every railway or newspaper should, for constructive criticisms and suggestions. If we are not doing all that we can we want to know it so that we may improve the paper.

As explanatory of the kind of service which we aim to supply we shall therefore briefly mention some of the things which the JOURNAL has done during recent years and some of its present aims.

The most important subject now before the electric railway industry, in our opinion, is publicity and the improvement of public relations, matters which this paper has long urged with all the resources at its command. We have shown our interest in the matter by publishing symposiums and single articles by experts on publicity and public relations, by running a series of cartoon editorials devoted entirely to these subjects, by reproducing notable newspaper and other advertisements and by editorial suggestions in nearly every issue. We intend to continue this campaign vigorously; and in doing so we solicit the support of those who agree with us that this is one of the "high spots" in the electric railway field.

Another example of the service which can be performed by a paper able to carry a message promptly to all connected with an industry is furnished by the accident reduction agitation. In a letter recently received from one of the pioneers in safety work, the writer says: "The phenomenal growth of the movement was in large measure due to the generous and far-sighted support given to it by the ELECTRIC RAILWAY JOURNAL. The JOURNAL recognized the possibilities of the project as far back as 1907, when railway companies which had been appealed to for moral support had shown themselves indifferent." The JOURNAL supported this movement not only because it considered that it was right but also because it realized that the safety movement meant large direct and indirect savings to the railways. Both of these results have been proved by subsequent experience.

Another example of the service which this paper has given to the industry is shown by its articles on car design. This paper was an early advocate of steel cars for city service, not because of any expectation of their greater safety, but because it believed that steel cars could be made cheaper and better than wooden cars. It advocated this type of construction at a time when many if not most of the car builders were still recommending wooden cars. It also early favored a type of construction in which the strength of the steel car was provided in the side girders in opposition to the old style of construction which resembled "a house on a flat car," and it has seen this idea generally accepted. Still other recent instances of JOURNAL service will be found in its advocacy of a modification of the M. C. B. journal box for high-speed electric service, of standardization of car and truck design, of rational units in rating boilers, of higher rates of fare, of discontinuance of the soliciting of advertisements from manufacturers for company publications, of better training of employees, of military preparedness for electric railways, etc.

We are mentioning these points as examples, not with the idea of depreciating the constructive work of others along these lines or of arrogating to ourselves more than is our due. All have assisted, and this is the point which we want to make, namely, that just as the transportation utility in any city can be helped to give good service by the co-operation of all, so it is in journalism. The converse of this is equally true in journalism and railroading. This is that the welfare of the community concerned is correspondingly increased when it has a service broad and extensive enough to reach all who have occasion to use it. This, in the journalistic field, would include operator, manufacturer, regulator, investor and public.

Catenary Trolley Construction Used on Manhattan Bridge to Insure Safety

Security Against Damage to Bridge, Good Operating Features and Attractive Construction Obtained by Using Simple Catenary with 90-ft. Pole Spacing

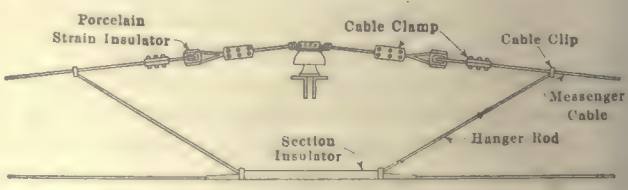


CATENARY TROLLEY CONSTRUCTION ON MANHATTAN BRIDGE—VIEW OF COMPLETED CONSTRUCTION AND FIRST TWO CARS TO CROSS BRIDGE UNDER NEW OVERHEAD WORK

THE Manhattan Bridge Three-Cent Line runs between the corner of Flatbush Avenue and Fulton Street, Brooklyn, N. Y., and the corner of the Bowery and Canal Street, Manhattan. The route is 2 miles long, about half the distance being over the Manhattan Bridge. This line had been operated on the lower-deck tracks of the bridge, but since these tracks were intended to be used by the rapid transit line connecting the subways in Manhattan and Brooklyn, it became necessary to operate the Three-Cent Line on the upper deck. This made it essential to adopt a method of supporting the trolley wire which would give the maximum degree of safety as well as good operating conditions. A construction which would not detract from the attractive appearance of the bridge was also desirable.

The use of the usual span-wire construction was not feasible in this case since a double row of trolley poles would be required and any method of supporting the trolley wire directly from span wires or from poles spaced say 50 ft. apart was considered unsafe since the copper wire, if broken, might come in contact with and burn to a dangerous degree some of the vital members of the bridge. The catenary construction shown in the accompanying illustrations was therefore decided upon, and it has been so installed that if the contact wire should break, the hangers are spaced close enough together to prevent the freed ends of the wire from coming in contact with the steel members of the bridge.

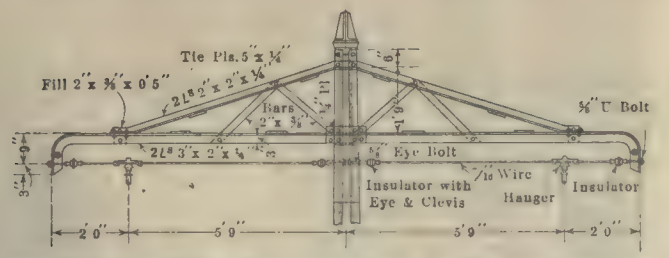
The average pole spacing is 90 ft., the height of the contact wire above the top of the rail is 16 ft., and the distance between the contact wire and the messenger wire at the insulators is 20 in. The details of the length and spacing of the hangers for a typical 90-ft. span are given by the diagram on the opposite page. A 7/16-in. Siemens-Martin double galvanized, seven-strand steel cable was used as a messenger wire. This was strung in the usual manner, and the sag adjusted so that the middle of each span was 16 ft. 10 in. above the top of the rail. Roebling Brother's No. 000, hard drawn, standard grooved copper wire was used for the contact wire. While stringing this wire it was



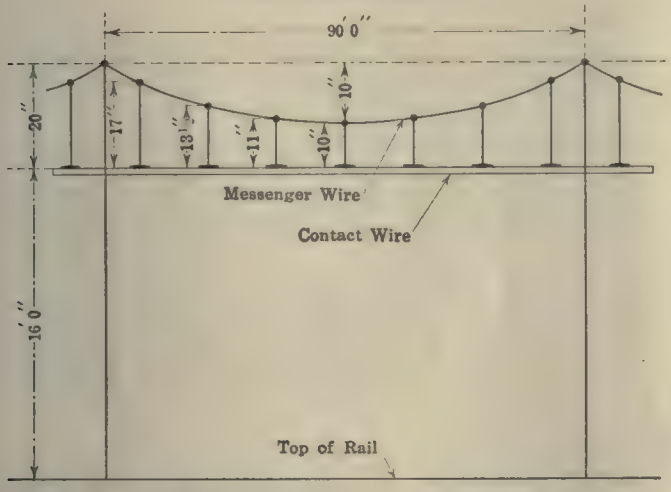
CATENARY TROLLEY CONSTRUCTION ON MANHATTAN BRIDGE—DETAILS OF INSULATED JOINT

allowed to rest at the ends of the crossarms, and as the hangers were attached the wire was slipped over the ends of the crossarms. One of the illustrations shows two gangs at work attaching the catenary hangers. The tower cars were made by erecting a scaffolding on an ordinary flat truck.

At the expansion joints of the bridge, steel bar construction is used in place of the catenary. The bar is



CATENARY TROLLEY CONSTRUCTION ON MANHATTAN BRIDGE—METHOD OF SUPPORTING TROLLEY WIRE ON BRIDGE APPROACHES WHERE CATENARY WAS NOT NECESSARY FOR PURPOSES OF SAFETY

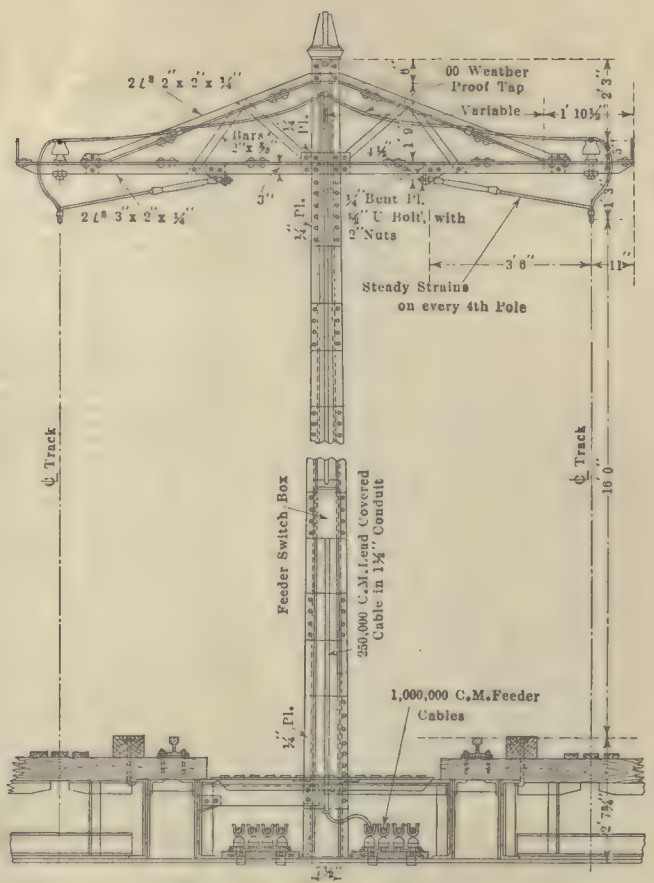


CATENARY TROLLEY CONSTRUCTION ON MANHATTAN BRIDGE—LENGTH AND SPACING OF HANGERS FOR A TYPICAL 90-FT. SPAN

made in sections, the adjoining ends of which are far enough apart to allow for the expansion and contraction of the bridge. A bronze sleeve of ⅛-in. metal connects the ends of the steel bar and provides the bearing surface for the trolley wheel at these points. A wooden trough provides a suitable protection over the bar. This may be seen under the bridge tower in one of the illustrations.



CATENARY TROLLEY CONSTRUCTION ON MANHATTAN BRIDGE—CONSTRUCTION GANGS ATTACHING HANGERS BETWEEN MESSENGER WIRE AND TROLLEY WIRE



CATENARY TROLLEY CONSTRUCTION ON MANHATTAN BRIDGE—DETAILS OF STEEL POLE AND FEEDER CABLES

The drawing giving the details of the steel pole also shows the steady braces which are used at every fourth pole and the taps between the trolley wire and the eight 1,000,000-circ. mil, weatherproof cables which are supported on substantial feeders insulators on each side of the base of the pole. From these feeders, a 250,000-circ. mil, lead-covered cable in 1½-in. metal conduit leads to the feeder switch box, which is located at a convenient height on the pole and contains a 400-amp., quick-break disconnecting switch. The 250,000-circ. mil cable is continued from the switch box to the top of the pole, where it divides into No. 00 weatherproof cables, which connect with the contact wire. It was considered necessary to use lead-covered cable inclosed in metal conduit for the feeder connections on the pole in order to make them doubly safe from possible grounds to the steel poles. The trolley wire is divided into sections by insulated joints, and each section is fed by separate taps from the feeder cables so that each section is an independent electrical unit.

On the approaches to the bridge span-wire construction was used, since the catenary was not necessary for purposes of safety. The drawing in the top, left-hand corner of the page shows the details of this construction, which have been worked out by attaching the trolley wire in such a way as to make the appearance as attractive as possible and in harmony with the catenary construction on the bridge.

Since this construction has been in operation for some time without any trouble developing, it is good evidence that the requirements of safety have been well met. The construction above described was designed by the department of plant and structures, New York City, of which F. J. H. Kracke is commissioner and E. A. Byrne is acting chief engineer, and was built by Peet & Powers of New York.

Anatomy of the Interurban Report

Development of Electric Railway Accounting—General Characteristics of Typical Interurbans: Large Companies; Medium-Sized Companies with Less Than 20 Per Cent of Revenue From Freight, and Companies with More Than 20 Per Cent of Revenue From Freight — Sources of Information — Purpose and Scope of Analysis of Records—Methods, Limitations and Results of Analysis of Records

By F. W. DOOLITTLE

Consulting Engineer, New York, and Formerly Director of the Bureau of Fare Research, American Electric Railway Association

IN a previous article* it was pointed out that many causes have been contributing during recent years to the difficulties of interurban electric railways. By no means all interurbans have been subject to these perplexities. A number of properties have been so fortunate as to avoid situations which have brought others to grave financial difficulties, and some companies have been in a position to meet and overcome the difficulties confronting them. It should not be necessary to point out that the general comments made here and elsewhere, while applying to the industry as a whole, are frequently far from true when applied to individual properties.

Each company has its peculiar elements of strength and weakness, and nothing short of a careful and critical studying of a property together with local conditions will suffice to serve as a basis of judgment. Certain facts concerning the industry as a whole can, however, be determined from an examination of existing records without a knowledge of conditions other than can be gained from published financial and statistical reports.

Electric railway accounting has developed rapidly in recent years and is now reaching a stage where cost analysis is possible. In this it follows the development which is taking place in steam railroad accounting. Originally the accounts of carriers served two purposes: The first was to account for all income and thus enable the officers and directors to explain to the stockholders why so small a part of the gross earnings was available for dividends. The second purpose was to enable each superior officer to present to the men under his jurisdiction a statement of the expenditures of their departments, with a request for an explanation of any changes from the preceding month and the same month of the preceding year. It happened that for many years the train-miles and miles of track of most railroads increased regularly, and each department found in this a ready explanation for increased costs. As a result, railroad accounting systems developed a departmental classification, and "train-miles" and "track-miles" became the almost universal units with which costs were measured. Electric railways naturally followed as closely as practicable the accounting classification of steam railroads, and interurban properties, developing originally from urban properties, have used the same system.

Owing to their isolation and to the fact that they serve usually but one state, electric railways have been slower in reaching uniformity of accounting procedure than have steam roads. Since 1908, however, the adoption of a standard system has progressed rapidly owing to the study of this matter by the American Electric Railway Accountants' Association and the several commissions, as well as because of the authority of the Interstate Commerce Commission and other commissions to prescribe an accounting system. The present standard system was promulgated by the federal commission in 1914 and is therefore used by all interstate electric railways. A number of state commissions have adopted this classification as standard (sometimes slightly modified in form), and the American Electric Railway Accountants' Association at its convention in 1914 also adopted it.

The 1914 classification of operating expenses differs in several important particulars from its predecessor.† It has been in use too short a time to have resulted in a body of statistics of sufficient size to permit its use at present. Therefore, in the following paragraphs where figures of electric railway operation are cited they have been taken from reports made under the earlier (1908) classification.

In the previous article, in the issue of Sept. 2, 1916, comment of a general nature was made on the status of electric interurban transportation. It is now proposed to supplement this by an analysis of available reports of operating companies with the idea of illustrating the customary methods of analysis used in such cases, as well as the structure of such reports and the general results of operation as disclosed by the data contained in them.

FINDING THE REMEDY

"The question 'What can be done to correct unfavorable features of interurban operation?' cannot be answered from data contained in published reports. Only careful study by capable men can result in the best plans for the future. It is possible, however, to obtain some idea as to the likelihood of improvements from examining the following points:

"1. Is the revenue received for present business at a rate above or below the average?

"2. Is the present cost of operation above or below the average cost?

"3. Does the present volume of traffic appear to be normal for the communities served;

"4. Do the communities served appear to be developing so as to furnish more business in the future?"

"The third and fourth questions refer to what is probably the most important single factor in judging the future. The important thing is the relation between the ratio of gross revenue to investment today and the possible future ratio of gross revenue to investment."

THREE HYPOTHETICAL INTERURBAN PROPERTIES

As a preliminary to this study, three properties have been assumed based on an analysis of the published re-

*See "The Present and Future Development of Interurban Railways," ELECTRIC RAILWAY JOURNAL for Sept. 2, 1916, page 392.

†For a discussion of the changes made, see ELECTRIC RAILWAY JOURNAL for June 13, 1914, page 1321.

ports of 145 interurban electric railways operating over 13,000 miles of single track in about twenty states. The three companies are purely hypothetical, but represent the normal characteristics of a large number of companies of the same class. They may be described as follows:

The first is a large company whose characteristics are a composite or average of those of six of the largest interurbans in the United States.

The second is a company of average size whose characteristics are a composite of those of 128 companies, none of which has freight earnings in excess of 20 per cent of its operating revenue.

The third is a company of average size whose characteristics are a composite of those of seventeen companies, none of which has freight earnings amounting to less than 20 per cent of its operating revenue.

Tables I to IV show respectively the principal characteristics, the income statement, the operating revenues and the operating expenses of these three hypothetical properties. These tables, together with Table V, a condensed balance sheet, contain the data usually available from public sources.

In selecting the data used in computing these tables care was used to exclude all companies having any considerable part of their operation in cities. In many cases a knowledge of the property served to assist in the interpretation of the published figures, and in a few cases data were rejected because of obvious inconsistencies. In this study the most frequent sources of information were the statistical and financial reports published by the various state commissions. Those who are interested in the analysis of interurban reports, however, usually find one of the chief difficulties to be the fact

TABLE I - PRINCIPAL CHARACTERISTICS OF THREE HYPOTHETICAL INTERURBAN RAILWAYS

	Composite of Six Large Companies	Composite of 128 Medium-sized Companies—Freight Revenue Less than 20 Per Cent of Total Revenue	Composite of Seventeen Medium-sized Companies—Freight Revenue More than 20 Per Cent of Total Revenue
Miles of single track operated	475.53	89.8	89.8
Revenue cars available for service:			
Passenger	248	83	29
Express, etc.	41	3	10
Freight	340	23	232
Total	629	109	271
Car miles operated per year:			
Passenger	9,363,750	2,848,000	1,042,000
Other	1,755,537	148,900	483,000
Total	11,119,287	2,996,900	1,525,000
Revenue passengers carried per year	25,470,671	8,635,000	1,350,000
Miles per car per year:			
Passenger	37,700	33,700	24,250
Other	4,610	5,750	2,140
Total	17,750	27,700	5,300
Miles per hour:			
Passenger cars	16.74	12.10	12.61
Freight cars	6.00	6.23	3.05
Total	13.05	10.25	6.78

TABLE II—INCOME STATEMENT OF THREE HYPOTHETICAL INTERURBAN RAILWAYS

Item	Composite of Six Large Companies		Composite of 128 Medium-Sized Companies—Freight Revenue Less Than 20 Per Cent of Total Revenue		Composite of Seventeen Medium-Sized Companies—Freight Revenue More Than 20 Per Cent of Total Revenue	
	Amount	Per Cent of Revenue	Amount	Per Cent of Revenue	Amount	Per Cent of Revenue
Operating revenue	$3,388,500	100.0	$689,500	100.0	$488,000	100.0
Operating expenses	2,202,000	65.0	446,200	64.7	314,000	64.3
Net operating revenue	$1,186,500	35.0	243,300	35.3	173,000	35.7
Non-operating income*	303,840	9.0	48,250	7.0	13,680	2.8
Gross income	1,490,340	44.0	291,550	42.3	187,680	38.5
Deductions from income	1,701,550	50.4	230,610	33.4	205,290	42.0
Taxes†	154,730	4.5	45,700	6.6	23,850	4.9
Rentals	515,570	15.4	43,400	6.3	4,570	0.9
Interest	1,015,200	30.0	139,500	20.2	172,500	35.3
Miscellaneous	16,050	0.5	2,010	0.3	4,370	0.9
Net corporate income	(d) 211,210	6.4	60,940	8.9	(d) 17,610	3.5
Dividends	226,000	6.7	55,000	8.0	3,030	0.6
Other appropriations	5,201	0.1	.....	...	.....	...
Surplus or deficit for year	(d) 442,410	13.2	5,940	0.9	(d) 20,640	4.1
Operating ratio	.650	....	.647	...	.643	

(d) Deficit.

* For the use of railways operating other utilities as gas, telephone, etc., "Auxiliary Operations" accounts are provided. Net revenue-auxiliary operations precedes non-operating income in the income statement.

† Later classifications provide for deducting railway taxes directly from net operating revenue.

TABLE III—OPERATING REVENUES OF THREE HYPOTHETICAL INTERURBAN RAILWAYS

Item	Composite of Six Large Companies		Composite of 128 Medium-Sized Companies—Freight Revenue Less Than 20 Per Cent of Total Revenue		Composite of Seventeen Medium-Sized Companies—Freight Revenue More Than 20 Per Cent of Total Revenue	
	Amount	Per Cent of Revenue	Amount	Per Cent of Revenue	Amount	Per Cent of Revenue
Total operating revenue	$3,388,500	100.0	$689,500	100.0	$488,000	100.0
1 Passenger revenue	2,836,980	83.7	608,500	88.3	309,400	63.0
2 Express	94,480	2.8	9,400	1.3	7,020	1.4
3 Milk	28,880	0.9	3,450	0.5	4,620	0.9
4 Freight	311,870	9.1	41,590	6.0	126,450	26.1
5 Switching	2,870	0.1	260	0.1	4,810	1.0
6 Other train	15,380	0.5	4,420	0.6	7,100	1.4
7 Other transportation	5,420	0.2	750	0.1	12,000	2.5
8 Other operating	92,620	2.7	21,130	3.1	16,600	3.4
Total 2 to 5 inclusive	438,100	12.9	54,700	7.9	142,900	29.4

TABLE IV—OPERATING EXPENSES OF THREE HYPOTHETICAL INTERURBAN RAILWAYS

Item	Composite of Six Large Companies		Composite of 128 Medium-Sized Companies—Freight Revenue Less Than 20 Per Cent of Total Revenue		Composite of Seventeen Medium-Sized Companies—Freight Revenue More Than 20 Per Cent of Total Revenue	
	Amount	Per Cent of Revenue	Amount	Per Cent of Revenue	Amount	Per Cent of Revenue
Total operating expenses	$2,202,000	65.0	$446,200	64.7	$314,000	64.3
Way and structures	404,350	12.0	75,550	10.9	57,200	11.8
Equipment	299,520	8.9	53,800	7.8	43,300	8.9
Traffic	34,970	1.0	4,350	0.6	8,900	1.7
Power	375,390	11.0	70,600	10.4	51,900	10.7
Conducting transportation	750,790	22.2	181,000	26.2	101,900	20.8
General and miscellaneous	336,980	9.9	60,900	8.8	50,800	10.4

that information from these sources is out of date before it is published. This criticism applies also to the reports of the Census Bureau. The latter reports do not separate data so as to show the results of city, suburban and interurban operation. While in the past there has been little need of any separate showing, the increasing tendency of regulating bodies to base rates on costs is creating a demand for more detailed information. This will no doubt be reflected in the future studies prepared by the Census Bureau.

TABLE V—CONDENSED BALANCE SHEET OF THREE HYPOTHETICAL INTERURBAN RAILWAYS

Composite of Six Large Companies: Assets		Liabilities	
Property, plant and investment	$40,866,000	Securities	$43,000,000
Material and supplies	55,000	Special accounts	1,677,500
Bills receivable and miscellaneous assets	49,000	Bills payable and miscellaneous liabilities	3,758,500
Reserve, sinking and special funds	6,950,000	Unfunded reserves	1,564,000
Cash	1,545,000		
Deficit	535,000		
	$50,000,000		$50,000,000
Composite of 128 Medium-Sized Companies—Freight Revenue Less Than 20 Per Cent of Total Revenue:			
Property, plant and investment	$6,400,000	Securities	$6,000,000
Materials and supplies	7,500	Special accounts	550,000
Bills receivable and miscellaneous assets	62,500	Bills payable and miscellaneous liabilities	450,000
Reserve, sinking and special funds	452,000	Unfunded reserves	43,500
Cash	150,000	Surplus	28,500
	$7,072,000		$7,072,000
Composite of Seventeen Medium-Sized Companies—Freight Revenue More Than 20 Per Cent of Total Revenue:			
Property, plant and investment	$8,000,000	Securities	$6,750,000
Materials and supplies	9,500	Special accounts	925,000
Bills receivable and miscellaneous assets	50,000	Bills payable and miscellaneous liabilities	1,445,000
Reserve, sinking and special funds	1,120,000	Unfunded reserves	225,000
Cash	295,500	Surplus	130,000
	$9,475,000		$9,475,000

For a number of years the *McGraw Electric Railway Manual* furnished the most accurate and complete data on electric railways. This publication has not appeared since 1914. Unfortunately the reports of electric railways to the Interstate Commerce Commission are not published in detail, although they represent a considerable part of the industry and are more complete than some of the reports published by state commissions. In 1913 a total of 310 operating electric railways having total operating revenues of approximately $160,000,000 reported to the Interstate Commerce Commission. The Census Bureau in 1912 found 975 operating companies with operating revenues of $570,000,000.

For current reports the ELECTRIC RAILWAY JOURNAL and other publications devoted to this industry serve as the best sources, and information can also be obtained from the *Wall Street Journal, The Commercial and Financial Chronicle*, and other similar publications. All of the foregoing sources have been drawn upon for data for use in connection with the present studies.

QUESTIONS TO BE ANSWERED

While there is often much detail involved in making a study of a railway property, the customary method of procedure may be described as consisting of obtaining answers to the following questions:

1. What is the amount of the several classes of outstanding securities, and the order of their participation in the earnings of the company?
2. What is the amount of earnings available for return on the several issues of securities?
3. What is the margin of safety for each class of securities?
4. Is the situation showing improvement or otherwise?
5. What are the causes of the present situation and the apparent tendencies?
6. What can be done to correct unfavorable features?

The first three questions can be answered without difficulty from an examination of the usual published financial reports, but the others present difficulties which frequently cannot be overcome by means of information contained in published records.

THE ELECTRIC RAILWAY ACCOUNTING SYSTEM

Before examining into these various questions in the case of the three hypothetical interurban railways described above, it is desirable to review briefly the accounting system which is generally in use by electric railways, and which furnishes the basis of their records and reports. In every accounting department there are numberless details which must be taken care of, and many of the items which appear so clearly and definitely in the annual reports represent the results of whole series of special accounts which must be kept in considerable detail for the purpose of meeting the problems of management rather than from accounting necessity. For the present the records may be classified as (1) operating statistics and (2) financial data. The former consist of records of miles of track, car-miles, car-hours, number of passengers, tons of freight, ton-miles of freight, etc. The latter consist of the income account, profit and loss account, property and plant account, special accounts and balance sheet.

The income account represents the results of business for a given period, which in published statements is usually the fiscal year of the company. In it in more or less detail will be found the items listed in Table II.

The profit and loss account is provided for the purpose of adjusting gains and losses without affecting the income account in such a way as to render its use unreliable for comparative purposes. The principal items in the profit and loss account are as follows: (a) surplus or deficit at the beginning of the year; (b) surplus from operation during the year; (c) other credits arising from miscellaneous adjustments; (d) total credits; (e) deficit from operation during the year; (f) other debits arising from miscellaneous adjustments; (g) total debits, and (h) surplus or deficit at the end of the year. Some accountants carry net corporate income to item (b) of this account instead of bringing over surplus or deficit after dividends and other appropriations. They then include these items—dividends and appropriations—as additional debits in the profit and loss account.

The appropriations referred to may be of several sorts. Formerly accounts were set up and credited in this way for depreciation, accident, insurance and other reserves, but amounts for these items are now usually charged currently to operating expenses and placed in special funds which in turn are drawn upon for expenditures that otherwise would appear in operating expenses when and as made. Appropriations may also be made for the purpose of temporarily financing additions or betterments, pending more favorable conditions in the money market. It is not always possible to distinguish between appropriations of income as an item in the income account and a charge in the profit and loss account, or between additions to income and credits in the profit and loss account. Many accountants are, therefore, abandoning the separate profit and loss account and carrying adjustments directly to the income account.

The property and plant account contains in greatly varying detail the expenditures made for the various

TABLE VI—COST OF ELECTRIC RAILWAY TANGIBLE PROPERTY PER MILE OF SINGLE TRACK
(Average of Eighteen Urban Companies)

Item	Dollars per Mile of Single Track	Per Cent of Total—Average	Per Cent of Total—Maximum*	Per Cent of Total—Minimum*	Dollars of Tangible Property per Dollar of Operating Revenue per Year
(a) Land	$4,810	5.50	14.85	0	....
(b) Transmission and distribution	20,150	22.90	29.30	4.51	....
(c) Buildings and miscellaneous structures	12,170	13.85	15.32	0	....
(d) Plant equipment	15,450	17.60	50.00	0	....
(e) General equipment	14,460	16.45	30.53	0	....
(f) Roadway	20,800	23.70	75.00	11.82	....
Total	$87,840	100.00	....	....	4.71
(Average of Nine Interurban Companies)					
(a) Land	$2,060	5.48	10.42	0.83	....
(b) Transmission and distribution	6,950	18.47	29.50	8.48	....
(c) Buildings and miscellaneous structures	1,860	4.95	8.85	3.58	....
(d) Plant equipment	5,280	14.05	17.95	9.40	....
(e) General Equipment	4,420	11.75	15.25	8.15	....
(f) Roadway	17,100	45.30	61.20	38.60	....
Total	$37,670	100.00	....	....	7.28

*The items below bear no relation to each other, as they are derived from different companies.

items of real and personal, tangible and intangible property, plant and equipment. It should show the cost at the first of the year, and the cost of property retired and the cost of that added during the year, and the resulting cumulative cost at the end of the year. Special fund accounts are not usually shown in detail in published reports, only the balance at the end of the year being carried into the balance sheet as of that date.

WHAT THE BALANCE SHEET CONTAINS

In its condensed form the balance sheet will appear somewhat as shown in Table V, and will give the status of the several accounts as of that date. It will be found upon examination of railway reports that a variety of items is included in the balance sheet and that frequently it is impossible to judge of the status of the business without an explanation of these entries. Under ordinary circumstances the income account is of greater usefulness than the balance sheet because it does not contain as many items which require special analysis. No attempt can be made at this time to discuss all of the items which will be found from time to time in the balance sheet, and references will be confined to five general classes of assets and liabilities.

The first balance sheet group on the asset side, property, plant and investments, represents the book value of the property and should contain all amounts expended for the tangible and intangible elements. The following items come under this classification: Railway physical property, non-operating property, franchises and securities owned. The last item is usually set out separately from those preceding, though frequently not in detail. The items which go to make up railway physical property will be found to be lacking from most published reports. Securities owned usually represent the amounts paid for securities and therefore give little assistance in judging the assets of the company. Those properties which have been built up by the purchase and combination of smaller ones frequently find it impossible to show in detail the items of property and plant of the companies taken over and therefore only totals are included, the purchase price becoming the book value. If this is the case only the first of the two following questions can be answered: (1) Is the cost of property and plant as shown in the balance sheet reasonable in view of the size of the property? (2) Which items, if any, appear to be out of line?

The classification of property as prescribed by the Interstate Commerce Commission contains fifty items grouped under four heads as follows:

I.	Way and structures	Accounts 501-529 (29 items)
II.	Equipment	Accounts 530-538 (9 items)
III.	Power	Accounts 539-544 (6 items)
IV.	General and miscellaneous	Accounts 545-550 (6 items)

Some of the state commissions have prescribed classifications which in most cases are in less detail than the one outlined above. The Wisconsin Railroad Commission in a number of valuation proceedings made public its findings in the following form of summary which follows the general divisions of that commission's classification of tangible property accounts: Land; transmission and distribution; buildings and miscellaneous structures; plant equipment; general equipment, and roadway. The results of the valuation referred to above are shown in Table VI, the various property values being shown in dollars per mile of single track so that the figures may be used comparatively.

Table VI-A deals with capitalization rather than with value of tangible property, but in itself it permits an interesting comparison between various industries.

The second general class of assets listed in the balance sheet is materials and supplies. Two questions naturally suggest themselves in connection with the figures shown under this heading: (1) Is the amount commensurate

TABLE VI-A—RELATION BETWEEN INVESTMENT AND EARNINGS IN ELECTRICAL, STEAM RAILROAD AND MANUFACTURING INDUSTRIES

	Investment Capitalization	Persons Employed	Annual Sales or Earnings	Investment per Dollar Earnings	Investment per Employee	Earnings per Employee
*Electrical Industries:**						
Central electric stations	$3,038,000,000	104,000	$403,300,000	$7.53	$29,200	$3,875
Isolated electric stations	1,519,300,000	52,000	201,600,000	7.53	29,200	3,870
Electric railways—power	5,363,600,000	330,000	701,000,000	7.60	16,140	2,125
Electrified steam roads	204,700,000	15,000	30,300,000	6.76	13,650	2,019
Telephone	1,262,760,000	237,000	329,900,000	3.84	5,320	1,390
Telegraph—land and marine	231,600,000	44,000	75,300,000	3.07	5,260	1,712
Electrical machinery	469,100,000	185,000	383,300,000	1.225	2,539	2,070
Electrical dealers	15,000,000	50,000	120,000,000	0.125	3,000	2,500
Electrical jobbers	25,000,000	6,000	80,000,000	0.313	4,170	13,340
Total electrical industries	$9,929,060,000	1,023,000	$2,324,700,000	$4.27	$9,680	$2,270
Manufacturers:†						
Total manufactures (1914)	$22,790,880,000	8,265,426	$24,246,323,000	$0.938	$2,755	$2,935
Automobile industry (1909)	173,837,111	75,721	249,202,075	0.697	2,293	3,291
Railroads:‡						
Total steam railroads (1915)	$15,703,081,000	1,506,433	$2,941,567,000	$5.33	$10,420	$1,954

*From *Electrical World*, Sept. 2, 1916. †From United States Census. ‡From Interstate Commerce Commission reports.

Table VII—Earnings for a Typical Manufacturing Concern

Amount available for interest and dividends	$120,000
Bonds: $1,000,000.	
Interest requirements at 5 per cent	50,000
Times interest earned 2.4	
Balance available for dividends	$70,000
Preferred stock: $200,000	
Dividend requirements at 7 per cent	$14,000
Including prior requirements	64,000
Times earned—1.88	
Balance available for common stock dividends	$56,000
Common stock. $800,000	
Dividend requirements at 6 per cent	$48,000
Including prior requirements	112,000
Times earned—1.07	

with the size of the property and the extent of its operations? (2) Is the figure shown taken from an inventory of material stocks or is it a storekeeper's balance?

The third item, bills receivable, includes all the miscellaneous amounts owed the company, either on account or on notes. The principal question in connection with these figures is as to whether or not these amounts can be collected. Bad debts should be written off currently through the profit and loss account, and the inclusion under this general heading of items which are not collectible serves to indicate a surplus not in accord with the facts.

Funded appropriations represent amounts set aside out of cash and represented by cash, certificates of deposit or securities. These funds are not often shown in such detail that judgment can be formed as to the company's ability to realize quickly the sums so shown. In these funded appropriations there should be included amounts set up for the purpose of making renewals of property. It is now generally considered good practice to invest a part of such funds in extensions to the property, but no information showing the amount of such reinvestment has been discovered in published reports.

The fifth item, cash, needs no comment. It represents those assets immediately available, but it must not be confused with the item of surplus on the liability side. The amount of cash is frequently less than the book surplus, but it may be greater where cash is being accumulated immediately prior to the payment of large sums for taxes, interest, etc.

The first item of the liability side of the balance sheet is securities issued. This should include all securities that have been issued and are outstanding, although some of them may have been reacquired by the company. The totals are usually shown separately for bonds and stock. The detail of the usual condensed balance sheet is insufficient to indicate the order of participation of the several securities in the earnings. The additional information necessary for this purpose will be discussed in a later paragraph.

The special accounts contain the credit balances in the various accounts which cannot be closed out currently. Unfunded appropriations or reserves are usually amounts set aside out of surplus for the purpose of meeting future expenditures for such items as taxes, interest and the replacement of property. It is well to note in any case how the amount of quick assets compares with the unfunded reserves.

Bills payable and surplus need no comment except that surplus is not surplus if the assets are overstated or the liabilities understated. While this observation is elementary, it is nevertheless overlooked often enough to justify its repetition.

Examining the Outstanding Securities

To return now to a more general survey of the situation, the first question to be answered relates to the outstanding securities. Table VII shows for a typical manufacturing concern the securities, the amount of earnings available for meeting the requirements of the several issues, and the margin of security afforded for each, thus covering questions 2 and 3 as well as question 1. For this assumed case, which represents a moderately successful manufacturing company, it appears that there is in earnings an ample margin over the requirements of bond interest, and that the preferred stock would not suffer unless the earnings decreased by nearly one-half. A decrease in earnings of more than 7 per cent, however, would encroach upon the common stock requirements. Data for the three hypothetical interurban railways, similar to those given in Table VII, are presented in Table VIII.

Finding Out Whether the Situation Is Improving

The fourth question may now be considered: Is the situation showing improvement or otherwise? The single test usually used is a comparison for a number of years of the margin of earnings over interest and dividend requirements. This test is necessary but not sufficient. In addition, it is essential to know whether the amounts shown as net earnings are really earned; that is, whether they are over and above all costs of operation, including proper maintenance charges, an adequate accumulation of funds for making renewals and a sufficient provision for the amortization of bond discount, cost of limited term franchises and other expenditures which should not be carried permanently in capital account. To determine these facts requires the making of engineering and accounting examinations and the drawing of conclusions embodying the soundest judgment available.

If time and opportunity for such procedure are lacking, recourse may be had to ratios which may be determined from the usual published reports. The three

Table VIII—Interest and Dividends of Interurban Railways
(Participation in earnings of various security issues)

Item	Composite of Six Large Interurban Companies		Composite of 128 Medium-sized Companies—Freight Revenue Less than 20% of Total Revenue		Composite of Seventeen Medium-sized Companies—Freight Revenue More than 20% of Total Revenue	
Amount available for interest and dividends		$793,990		$200,400		$154,890
Bonds outstanding:	$21,600,000		$3,000,000		$3,450,000	
Interest requirements	4.7%	1,015,200	4.65%	139,500	5%	172,500
Times interest earned	0.78		1.5		0.90	
Balance available for dividends				60,900		
Preferred stock:	3,900,000		1,000,000		1,150,000	
Dividend requirements	5.8%	1,241,200		194,500		235,750
Including prior requirements		226,000	5.5%	55,000	5.5%	63,250
Times earned	0.64		1.07		0.66	
Balance available for common stock dividends				5,940		
Common stock:	17,500,000		2,000,000		2,150,000	
Dividend requirements						
Including prior requirements						
Times earned:						
Bond interest earned	3.5%		4.65%		4.8%	
Preferred stock dividend earned	None		5.5%		None	
Common stock dividend earned	None		0.3%		None	

units most commonly used are: (1) capitalization per mile of track. (2) Gross revenue per mile of track per year. (3) Operating expenses (including taxes and depreciation) per mile of track per year. The first two may be combined to give (4) gross revenue per year per dollar of capitalization, and the third and fourth to give (5) net revenue per year per dollar of capitalization.

If (4) gross revenue per year per dollar of capitalization is remaining constant or decreasing, an unhealthy condition of affairs is indicated, as it means that the investment cost per dollar of new business is increasing. If (5) net revenue per year per dollar of capitalization is increasing it may mean (a) the addition of more profitable business, (b) the increase of efficiency in operation, or (c) a decrease in charges for maintenance, renewals and depreciation. The first two results are highly favorable indications, but the third is not to be accepted as favorable without further examination to determine whether the decreased charges are caused by more efficient maintenance or by a lower standard of maintenance.

The usual way to form an opinion on this matter is to separate operating expenses into two groups: (1) Conducting transportation, general and miscellaneous expenses, and taxes; and (2) maintenance, renewals and depreciation charges. It is a fairly safe assumption that any material decrease in the second item indicates a lowering of maintenance standards, although since many of these costs may be postponed temporarily without great harm it is well to make the test by measuring maintenance, renewals and depreciation charges in terms of gross revenue and comparing the annual ratios of percentages over a period of several years.

In Tables IX and X are given values for the several items referred to above for the three hypothetical interurban railways already mentioned, for all electric railways reporting for the 1912 census, and for a group of important steam railroads, the data for which were taken from various reports of companies to the Interstate Commerce Commission.

The use of figures for the year ended June 30, 1915, is not satisfactory, as that period was less favorable for many companies than the average of several years preceding. Both 1916 and 1917 will show better results for the majority of companies. The figures cited, however, are only for purposes of illustration, and will not be assumed to represent other than average values for the periods to which they refer.

The Causes and the Tendencies

This brings the investigator to the fifth general question—the causes of the present situation and its apparent tendencies. Here the investigator finds less help from the published reports, although some indication of the answers to the following questions will be found therein. It is pertinent to inquire first as to the revenues. Are they what they should be? A clearer idea of the situation will be obtained if the following questions are answered:

1. What is the passenger revenue per passenger car-mile?
2. What is the freight revenue per freight car-mile?
3. What part of the total revenue comes from freight?
4. What are the transportation revenues per mile of track?
5. What is the passenger revenue per passenger-mile?
6. What is the freight revenue per ton-mile?
7. What is the revenue per thousand population served; and
8. Is the situation in respect to the seven preceding items improving or not?

As to operating expenses, the following questions may be asked:

1. What are the operating expenses per dollar of operating revenue?
2. What are the transportation costs per car-mile?
3. What are the equipment maintenance costs per car-mile?
4. What are the maintenance-of-way costs per track-mile?
5. What are the general and miscellaneous costs per dollar of other operating expenses?
6. What is the average speed of cars?
7. What is the number of car-miles per mile of track per year?
8. What is the average annual mileage per car?

Table X—Apportionment of Operating Expenses—Costs Per Mile of Single Track

	Conducting Transportation, General Expenses and Taxes		Maintenance, Renewals and Depreciation	
	Per Mile of Single Track	Per Dollar of Operating Revenue	Per Mile of Single Track	Per Dollar of Operating Revenue
Composite of six large interurban companies	$3,470	$0.488	$1,480	$0.207
Composite of 128 medium-sized interurban companies—freight revenue less than 20 per cent cent of total revenue	4,050	0.526	1,460	0.188
Composite of seventeen medium-sized interurban companies—freight revenue more than 20 per cent of total revenue	2,640	0.487	1,120	0.206
Electric railways (composite of all operating companies):				
1902	6,090	0.492	1,340	0.122
1907	6,200	0.490	1,750	0.143
1912	7,030	0.497	2,100	0.152
Steam railroads (composite of six representative companies):				
1912	4,080	0.437	3,030	0.281
1915	4,470	0.426	3,020	0.295

Table IX—Comparative Units of Operation and Capitalization.

	Capitalization per Mile of Track	Gross Revenue per Mile of Track	Operating Expenses (Including Taxes and Depreciation) per Mile of Single Track	Gross Revenue per Dollar of Capitalization	Net Revenue per Dollar of Capitalization
Composite of six large interurban companies	$90,300	$7,750	$4,950	$0.0858	$0.0350
Composite of 128 medium-sized interurban companies—freight revenue less than 20 per cent of total revenue	66,800	8,220	5,510	0.1232	0.0592
Composite of seventeen medium-sized interurban companies—freight revenue more than 20 per cent of total revenue	75,200	5,600	3,760	0.0744	0.0278
Electric railways:					
1902	96,287	11,640	7,430	0.1209	0.0481
1907	100,495	12,610	7,950	0.1255	0.0489
1912	104,930	14,500	9,130	0.1383	0.0581
Steam railroads:					
1912	56,500	10,100	7,110	0.1786	0.0586
1915	56,200	10,240	7,490	0.1823	0.0482

These questions are but a few of those suggested by an examination of the report of an interurban electric railway. Neither the extent of information which can be obtained in this way nor its pertinence can be foretold, and frequently the investigator will meet with but slight success in attempting to reach conclusions by this method. There is, however, much to be learned in this way if one is willing and able to recognize negative results—that is, that the figures prove nothing. Average values for certain of the foregoing items are shown in Table XI.

One most important item will frequently be obtained only with difficulty, *viz.*, the relative profitableness of the various classes of freight and passenger business, since the classification of accounts does not lend itself readily to the determination of these costs. The advent of regulation of rates on the cost basis makes such determination of increasing importance, as it is no longer considered a justification of any individual rate that the combined revenue from all rates is approximately what it should be. In every case it is of great importance to know the tendency of the units and ratios suggested above, and it is only by examining these suggested details that the causes of the tendencies shown in the corporate income account can be known.

TABLE XI—COMPARATIVE UNIT COSTS FOR INTERURBAN RAILWAYS

	Composite of Six Large Interurban Companies	Composite of 128 Medium-Sized Companies—Freight Revenue Less than 20 Per Cent of Total Revenue	Composite of Seventeen Medium-Sized Companies—Freight Revenue More than 20 Per Cent of Total Revenue	Steam Road Composite of Six Companies
Passenger revenue per passenger car-mile	$0.303	$0.214	$0.297	$0.208
Freight revenue per freight car-mile	0.250	0.367	0.296	0.105
Per cent of freight revenue to total revenue	13.1%	7.9%	29.4%	67.2%
Transportation revenue per mile of single track	$6,820.00	$7,440.00	$5,270.00	$9,900.00
Passenger revenue per passenger mile	....	....	....	0.0193
Freight revenue per ton mile	....	....	....	0.0073
Operating expenses per dollar of operating revenue	0.650	0.647	0.643	0.693
Transportation costs per car-mile	0.1006	0.0838	0.1003	0.0450
Equipment maintenance per car-mile	0.0268	0.0179	0.0284	0.0227
Maintenance of way per mile of single track	848.00	842.00	647.00	1,265.00
General and miscellaneous expenses per dollar of operating expense	0.1525	0.1365	0.1620	....*
Average speed of cars (miles per hour)	13.05	10.25	6.78	....
Car-miles per mile of single track	23,500	33,350	16,950	77,800
Miles per car per year—total	17,750	27,700	5,330	10,010
Passenger	37,700	33,700	24,250	58,600
Freight	4,610	5,750	2,140	8,650

*Cannot be obtained on a comparable basis.

It should be emphasized that efficiency of management cannot be judged by this means alone. No class of men can come nearer to working miracles than the railway operators of to-day, but they must work with conditions as they find them. Results cannot be more uniform than conditions, nor can there be earnings without traffic.

One is tempted, in examining the unit costs disclosed by answers to the preceding questions, to compare them with similar units determined from the records of other properties. Such procedure is not particularly profitable, although it will result in fixing attention on items which show some divergence. For example, wages of trainmen per car-mile may appear to be substantially the same for two companies, one operating in the intermountain region and the other in the South Atlantic district, and so pass with little notice. At least three factors are involved here, each of which must be known before the suggestion of equal efficiency of operation can be accepted. These are (a) the hourly rate of wages, (b) the speed of cars and (c) the number of trainmen per car. It is because of the complexity of the problem that attempts to decide as to the efficiency of operation and the soundness of the business on the basis of published reports alone are distinctly hazardous. In addition, average or normal revenues and costs mean very little. The road with the highest earnings is not content until it has bettered its own record, and the road with the lowest costs will likewise attempt to make them lower still. But while there is and can be no absolute standard, comparative figures frequently suggest the line of investigation which yields the answer to the question, "What are the causes of the present situation?"

WHAT REMEDY CAN BE USED

The sixth question, "What can be done to correct unfavorable features?" cannot be answered from data contained in published reports. Only careful study by capable men can result in the best plans for the future. It is possible, however, to obtain some idea as to the likelihood of improvements from examining the following points:

1. Is the revenue received for present business at a rate above or below the average?
2. Is the present cost of operation above or below the average cost?
3. Does the present volume of traffic appear to be normal for the communities served?
4. Do the communities served appear to be developing so as to furnish more business in the future?

The first two questions dealing with operating revenue and operating expenses may be answered by expressing revenues and expenses in terms of car-miles. When the transportation of freight is involved the revenue per passenger car-mile and that per freight car-mile should be shown separately, and by a proper allocation of direct charges and apportionment of common charges, the costs of freight and passenger business should be determined. This will permit of an examination of net earnings as well as gross, and will indicate, when the scale of rates is compared with those of other companies, something as to the relative profitableness of the various lines.

The third and fourth questions refer to what is probably the most important single factor in judging the future. It cannot be determined from the ordinary published records, or in every case from direct examination of the property. This factor will be termed "development" and defined as the relation of present business to possible future business. Stated more definitely, the important thing is the relation between the ratio of gross revenue to investment to-day and the possible future ratio of gross revenue to investment. The bonds of a property which earns twice its fixed charges in a fully developed field may be less desirable than those of a company which now earns only a little more than its fixed charges, but which operates in a field which is under-developed and capable of large expansion. This one ratio, that of investment per dollar of gross revenue together with the knowledge of possible development as above defined, will tell more about the worth—that is the soundness of any property—than volumes of unit

costs will. Is the field a potential market of importance? If not, the industry is likely to be unsound, even though the present earnings may be sufficient to pay a profit.

Present-day inefficiency in operating may be corrected by painstaking care, and potential markets may be developed by wise and persistent effort, but the field must have possibilities or the future can yield nothing but disappointment. It may be urged that the utility which has attached the most business to itself is penalized on this basis by comparison with one less fully developed; but if it has been developed at a capital expenditure such as to maintain at its original value the ratio of the investment to gross earnings, then it is not so attractive a property as one which has possibilities of growth before it.

For National Defense

General Harries Explains How the Electric Railways Can Help

TELEGRAM (WESTERN UNION)

E. B. BURRITT, OMAHA, NEB., Feb. 7, 1917.
Secretary, American Electric Railway Association.
NEW YORK.

Responding to your telegram this date I would say that the most important field of usefulness of electric railways in the matter of aiding in national defense is in connection with transportation of men and material from and to standard steam lines to our coast artillery posts. Of course there will be other opportunities for co-operation in connection with transportation to and from mobilization camps throughout the country, these latter, however, almost invariably as distributers to and from standard steam roads.

The first thing of value which can be done by the electric railways will be to contribute promptly and fully all information called for by the Committee on Co-operation with the War Department. Without the necessary data it will be impossible to create any workable plan.

The problem of effective partnership between the steam and electric roads will be by no means capable of easy solution. The desire of the association's committees is to find out how many electric roads are in shape to handle without breaking bulk the heavy material which may be conveyed to junction points by steam and how many others there are which could be rapidly made fit for such service. Motive power, track curvature, clearances and bridges have to be primarily considered. In the many cases where electric roads will be unable to handle steam rolling stock we must be informed as to the usable equipment which can be depended upon, so that there will be no guesswork as to the number of troops or the tonnage of supplies that could be successfully handled in the shortest practicable period of time.

To attempt to set forth just now the questions which the committee may find it necessary to ask is neither practicable nor necessary. Every operating official can easily visualize the situation and will appreciate the difficulties which with the assistance of the federal government may have to be met and overcome.

Very few of our coast defense posts are without electric railway connection with near-by towns. Very few of these posts have anything like direct steam connection. What we therefore desire to know is the physical relationship of steam and electric carriers, the ability or inability of the several electric roads to maintain effective transportation communication with steam roads and then we must have the facts as to the manner in which men and supplies can be handled either regularly or in time of emergency.

The best service which can now be rendered by member companies will be the speediest possible reply to any inquiries sent out by the committee and by volunteering such suggestions or information as will be calculated to assist the committee in doing its work.

GEORGE H. HARRIES,
Chairman of Committee on Co-operation with the War Department.

Temporary Relief for Boston Elevated

Special Commission Recommends Sale of Cambridge Subway to State, Graduated Rental for Dorchester Tunnel, Reduction in Compensation Tax, Increase of Prepayment Areas and Other Measures to Relieve Present Situation—Fare Increase or Transfer Charge Is Not Favored Now, but Further Investigation of the Company's Administration Is Recommended

THE SPECIAL RECESS COMMISSION now reporting to the Massachusetts Legislature on the financial condition of the Boston Elevated Railway was organized about the middle of 1916 by legislative resolution as a result of the railway's plea for relief. The commission was composed of the Lieutenant-Governor of the State as chairman, the President of the Senate, the Speaker of the House, two members of the Senate, four members of the House, and the full boards of the Public Service Commission and the Boston Transit Commission.

After long and careful consideration of the company's brief, abstracted in the ELECTRIC RAILWAY JOURNAL of Sept. 30, the commission has recommended that the Legislature grant certain measures of relief which do not involve any direct burden on the public, as described below. The commission considered the question of a fare increase but noted certain objections to it and recommended that action in this matter be deferred for the present. It suggested that the Public Service Commission investigate and report by Feb. 1, 1918, upon the company's efficiency of management and that the Boston Transit Commission should report at the same time upon the prospective rapid transit needs for the next decade. [EDITORS]

IN an exhaustive report dated Feb. 1 the special legislative commission investigating the financial needs of the Boston (Mass.) Elevated Railway recommends various measures for the temporary relief of the company and advocates an additional investigation during the coming year by the Massachusetts Public Service Commission of the general efficiency of the road's administration. As has been forecasted in this journal, the company's suggestions relative to fare increase and transfer charges are not favored by the commission at this time. The sale of the Cambridge subway to the State and certain reductions in taxation burden, however, are favored as the means of providing the company with funds which cannot now be obtained on account of its inability to issue further securities.

The commission points out that the company cannot issue additional necessary capital for the equipment of the tunnels and rapid transit lines now in the course of construction and for other improvements required. The floating debt of the company on Jan. 17, 1917, was $3,260,000. To raise by short-term loans the amount of additional capital which will be urgently needed within the near future would probably be impossible. Even if it were done, it would probably be at excessive cost and would leave the company at the mercy of changing financial conditions. The commission emphasizes the vital need for new capital if the community served is not to stagnate, and holds it probable that from $5,000,000 to $7,000,000 new capital will be needed in the near future for rapid transit line improvements alone. This does not include additions and improvements to the surface system or new subways and tunnels.

While the company would not have to pay for these latter structures, the report points out that it cannot be expected to lease them upon terms which would further imperil its ability to earn a fair return for its stockholders. The situation, whatever its causes may be, is said to be one which calls for definite action in the public interest.

The commission states that there is no "water" in the capitalization of the system, and that the return received by the stockholders has not been excessive. Furthermore, it states that the evidence justifies the conclusion that the company has endeavored in a spirit of co-operation to meet the demands of the public for rapid transit facilities, although the cost has been far greater than anyone would have ventured to predict when the company was organized; that the facilities now offered are immeasurably superior to those formerly enjoyed, and that the company has, especially within the last few years, been subjected to heavy additional burdens. Not only have the stockholders not of late received a fair return upon their actual cash investment, but this return is likely to decrease in the immediate future. The present stoppage of new capital will, unless the impediments are in some way removed, create at no distant date intolerable transportation conditions within the metropolitan district.

RELIEF NOT IMPOSING ADDITIONAL BURDEN UPON PUBLIC

The commission recommends without hesitation all the proposed measures of relief which do not impose an additional burden upon the public. The first of these is the return of the $500,000 guarantee fund deposited with the State at the time of the company's organization. Second is the purchase of the Cambridge subway by the State, which the commission favors rather than its purchase by a municipality outside of Boston. The cost of the Cambridge subway proper, exclusive of the Boston underground connection, was about $9,000,000. This sale would provide the company with additional capital at a lower cost than by the issuance of its own securities, if this could now be done. It would not reduce existing charges, because the cost of the Cambridge subway is represented by outstanding capital which could with difficulty be retired. It would merely provide the company with new capital at a lower rate of interest. The commission recommends instalment payments to the company under the direction of the Public Service Commission, and urges that authority be given the company to make loans or advances to the West End Street Railway from the money received to provide the latter with capital.

In regard to the enormous cost of subways and tunnels in comparison with ordinary facilities for surface transportation, the report points out that while such structures, if operated with a train service, with stops not too close together and with a dense traffic, and if accompanied by a corresponding decrease of surface car mileage run, do make possible a material decrease in operating cost, much time elapses before traffic can be adjusted to the new routes and the full saving realized. Furthermore, it is always desirable to build subways with an eye to the future and to provide a capacity much greater than would be required during the first few years of operation.

In view of this, the report states, the suggestion that

the company be relieved, during the early years of operation of a subway, of a certain portion or the whole of the rental, making these amounts up in subsequent years, with interest, is entitled to consideration. Under the present practice on a certain day a subway is not in operation and no rental is being paid for it. On the very next day it is put in service, and the full amount of the rental begins to accrue, although the traffic which it carries at the beginning is for the most part not new traffic but business diverted from other lines. There is no sudden increase in the total traffic of the system. The burden thus imposed is very great. When the Dorchester tunnel, for example, is opened, the company will immediately become subject to a rental of about $441,000 per year, equal to nearly 2 per cent on its capital stock. The commission is strongly inclined to the belief that in leases of future subways it would be wise to arrange a graduated rental, with provision for ultimate full compensation including interest.

This simply means, if the initial rental is less than the interest charges paid by the city, charging the cost of the subway with not only the interest during construction but the interest, or a portion thereof, during the early years of operation. The report points out that it is universally the practice and sound financially to charge interest during construction to the capital account, for it is as much a part of the cost of the work as money spent for steel, concrete or engineering services. It is only a step further and merely a difference in degree to charge to capital some part of the interest during the period before the work is self-supporting. The principle has in effect been recognized by the Massachusetts Legislature in allowing the use, without rental charge, of a portion of the Dorchester tunnel in advance of the completion of the whole. In industrial financing it is frequently necessary to pay some portion of interest out of the capital account after the work has been put into service. Many undertakings, the report states, could not be carried out unless this were done, for few or no properties, unless financed largely by stock issues, can fully earn fixed charges immediately upon being put into use. The commission recommends that a gradual rental be allowed for the Dorchester tunnel either by application of proceeds from the sale of the Cambridge subway or proceeds of bonds to be issued by the company in excess of the present legal limit, subject to the regulation of the Public Service Commission and with a graduated period not exceeding three years from the tunnel opening.

Temporary Capitalization of Replacements

If it were not for the present abnormal level of equipment prices, probably $3,000,000 or $4,000,000 could be spent immediately to good advantage by the company in buying additional rolling stock and substituting new cars for old. There is reason to believe that the resulting saving in operating expenses would cover the interest on the investment and also amortize the cost of the abandoned cars within a short period of years. Even with cars at their present prices, the report says, a substantial investment of this nature is distinctly desirable. If the company had a depreciation fund large enough for such replacements, its position would be very favorable, but on June 30, 1916, only $444,263 was in this fund, an amount insufficient for the purpose. Under Chapter 671 of the Acts of 1914 street railways may, with the approval of the Public Service Commission, issue bonds beyond the ordinary limit to fund the cost of replacing or reconstructing their property, provided they are retired from earnings within ten years. The Boston Elevated Railway cannot take advantage of this statute with respect to surface cars, as these belong to the leased West End company. The commission recommends that a portion of the funds received from the sale of the Cambridge subway be authorized for the purchase of new equipment, or that rehabilitation bonds be permitted. On account of the high price of equipment a fifteen-year period is recommended, subject to the approval of the Public Service Commission.

Construction of Prepayment Areas

If additional inclosed areas can be provided at important transfer points so that paper transfers may thereby be eliminated, the total volume of transfers will be so reduced that an effective auditing system may be introduced. This is in the public interest, in the opinion of the commission, and the report recommends that the company be given the right of eminent domain to take private property for such transfer areas, with approval of the Public Service Commission. When such areas legitimately form a part of a subway line, they should be constructed subject to the approval of the Boston Transit Commission, and the cost of their construction charged to the cost of the subway.

Measures Imposing Additional Burden on Public

The foregoing measures will, if adopted, make it possible for the company to obtain, at a low rate of interest, all the capital needed within at least the next three years, and for the most part would be desirable and in the general interest were the company prosperous. These measures, however, will not in the immediate future effect any permanent improvement in the position of the company's stockholders. It has been strongly urged that some more fundamental and more positive form of relief should be provided for in the way of further contributions from the public to the company to the end that transportation development in the Metropolitan district may in no way be imperilled. Two general methods exist for accomplishing this. First, remission, either temporary or permanent, of taxes or other similar burdens placed upon the company; and, second, an increase in the rate of fare.

Abolition of the Compensation Tax

This tax consists of seven-eighths of 1 per cent of the gross earnings of the company, with the proviso that if the company pays dividends in excess of 6 per cent a sum equal to such excess shall be paid as a part of the compensation tax, in addition to the percentage of gross earnings. This amounted to $160,786 in 1916. The report states that when the stock of a public utility is worth less in the market than the amount of its cash investment, as is the case in Boston, the franchise value has for the time being ceased to exist. The company has agreed to assume additional heavy expenses for paving and street surface maintenance. The commission recommends that the compensation tax of seven-eighths of 1 per cent of gross earnings be abolished, but that the provision of the statute requiring a sharing with the public of dividends above 6 per cent remain in force.

The Problem of Increased Fares

A fare increase, introduction of a zone system or transfer charge, it is said, would violate the company's contract with the State. The commission is of the opinion that a fare increase would probably not produce additional net revenue in proportion to the increase. Furthermore, a zone system would be impracticable. Such a system would require an interior zone of about 4.75 miles from the urban center, with one or more outer zones. It would be necessary to include the terminals

of the rapid transit lines within the interior zone, as the expense and inconvenience of attempting to collect additional fares on rapid transit trains would render such collection impracticable. Moreover, the zone system would be open to the objection that the territory served by the company has been developed, values have been fixed and homes established on the basis of a uniform fare.

The suggested charge for transfers appears difficult in application to Boston. The arrangement of the system requires a transfer in the vast majority of rides. A penny charge for a transfer at such points as Park Street, Dudley Street, Sullivan Square, etc., would assume the character of a 6-cent fare upon the entire system or else would throw a burden upon the surface lines which they are not adapted to bear. There appears no reason to recommend a transfer charge on the surface system at this time, in view of the fact that transfers are frequently given, not to increase the length of ride, but, for the sake of economy, to avoid the running of through cars.

FURTHER REMISSION OF TAXES

The commission investigated at considerable length a plan for the remission of the company's so-called franchise tax (amounting in 1916 to $403,149), under the general supervision of the Public Service Commission. It recognizes that every city gains largely, financially and otherwise, by every extension of its transportation facilities, and particularly by the construction of rapid-transit lines. This consideration may justify a municipality in bearing some share of the cost of providing these traffic facilities, as in New York and Philadelphia. Nevertheless, while the plan devised by the committee of the commission for making good possible future deficiencies in earnings by a temporary remission of taxes has favorably impressed many of the commission, the latter concludes after careful study that action along these lines is not desirable at present.

FURTHER INVESTIGATION NECESSARY

The report states that a more thorough investigation of the company is required than time has so far permitted, before the adoption of any relief measures in the way of further taxation reduction or fare increase. It must be shown that the necessary revenue cannot be secured by further gains in operating efficiency, including improvements in equipment and in methods of car operation, the reduction of relative operating cost through the diversion of traffic to rapid transit lines, etc. Under present abnormal conditions, traffic and earnings are increasing at present more rapidly than ever before in the history of the company and at a rate faster than that on which its forecast of future financial results was based. Positive knowledge of the financial conditions of the future is not available, however, and the commission feels that more adequate information as to the probable outlook is needed. It is also advisable that a thorough investigation be made to determine whether the company can increase its net earnings through more efficient or economical methods of management and operation. Supplementing this investigation may properly come a parallel investigation of the desirable development of transit facilities during the next decade. The commission recommends that the efficiency investigation be conducted by the Public Service Commission and the transit development investigation by the Boston Transit Commission, both to report to the 1918 Legislature by Feb. 1 next.

In deferring definite action upon the more radical measures for relief, the commission feels that no sacrifice of the public interest is in any way involved. The minor measures of relief recommended will relieve the present stoppage of capital supply and will enable the company to complete the work to which it is already committed, and to make the additional improvements which are in its own and the public's interest. At the end of another year it will be possible to determine what further action, if any, is desirable in the public interest, the conditions upon which it should be based and the safeguards by which it should be surrounded.

PRESIDENT BRUSH'S COMMENTS

Commenting upon the report of the commission, President Brush said:

"The measures proposed by the commission will temporarily, at least, and to some extent, put the company in a better position to meet the demands of the public. The company is gratified that the members of the special commission are unanimously of the opinion that the company should have some financial relief. In view, however, of the increase in the cost of labor and materials and the enormous cost of additional rapid transit facilities, the company is firmly convinced that it will be necessary either that the communities bear a portion of the burden of additional rapid transit facilities, as is now done in New York and is proposed in Philadelphia, or else that there be an increase in fares.

"We understand that the possibility of this is recognized by the members of the special commission in view of the fact that they have referred the question of further relief to the Public Service Commission for further investigation and recommendation and the question of additional rapid transit facilities to the Boston Transit Commission. It scarcely seems necessary to state that in so far as any measures adopted by the Legislature will enable it to do so, the company will promptly avail itself of the means afforded to buy additional cars and otherwise to improve and extend its service."

Cedar Pole Market Steady

Northern White Cedar Association Discusses Business of Past Year

The twenty-first annual meeting of the Northern White Cedar Association was held at the Radisson Hotel, Minneapolis, Minn., Tuesday and Wednesday of this week. It was attended by about fifty representatives of the leading pole producers of the country. No set papers were read, the sessions being devoted to discussions regarding the economical production and sale of cedar poles.

In his annual address the president, H. L. Partridge, stated that one of the most important features of the work done during the year was the advertising campaign that had been conducted through the technical papers. The anticipated volume of business had not been realized during the year 1916, but this was due to the unsatisfactory condition of the metal market which held up temporarily the big construction work that is contemplated. Other speakers discussed the subjects of insurance and of surplus stock, attention being called to the fact that the year's shipments of 20-ft. poles closely approximated the average sales for the five years preceding, and that poles 25 ft. and longer were but 35,000 less than the same average. Emphasis was laid upon the necessity of being able to furnish, at close intervals, inventories in order that production and consumption demands could be more accurately gaged.

At the election of officers for the ensuing year J. C. Kirkpatrick of Escanaba, Mich., was made president; J. E. Gerich, vice-president; and L. A. Furlong and T. M. Partridge, directors. W. B. Thomas was continued as treasurer, and N. E. Boucher as secretary.

Strike Restriction Plan Opposed

Labor Will Fight Plan of New York Commission or Any Bill to Prevent Strikes—Utility Managers Say Plan Will Not Be Effective

During this week the Public Service Commission for the First District of New York has been conducting a series of hearings on its tentative plan for restricting strikes on electric railways in New York City. The full text of this plan was published in the ELECTRIC RAILWAY JOURNAL of Jan. 27. Thus far the hearings, which will be continued next week, have served only to develop the fact that public representatives are inclined to look favorably upon the plan as a proper protection of the paramount right of the public to continuity of service, but that organized labor is unqualifiedly opposed to any wage system or strike-prevention scheme that is not based upon the entirely voluntary act of employer and employee. As for the utilities concerned, these doubt the possibility of success for the proposed plan and prefer to be left to adjust matters with their employees without interference from outside parties.

In opening the hearings on Feb. 6, Oscar S. Straus, chairman of the commission, explained the plan and laid particular emphasis upon the provision for a wage board, composed half and half of company representatives and employees. He thought that such a board would settle disputed questions regarding wages, hours and working conditions without the bitterness that usually arises when the company and the main body of employees reach the crucial point in their direct negotiations. The question as to whether there should be one wage board for the entire State or one for each railway system had been left open, Chairman Straus said, and no opinion on this would be formed until all parties had been heard.

The speakers at the first hearing were Albert Shaw, editor *The Review of Reviews*, and Delos F. Wilcox, franchise expert, New York, N. Y. Mr. Shaw, after explaining the growth of public interest in municipal transportation, said that the plan suggested seemed fair to employees and they should be willing to accept it. Mr. Wilcox stated that the wage-board representatives of the unorganized men should be selected by the commission, so that the company with its half membership on the wage-board might not easily control the board through the unorganized men. He also thought that there should be provision for appeal by either side to the commission, if the finding of the wage board was not unanimous.

During the colloquy with Mr. Wilcox, Chairman Straus explained that the plan is not claimed to be an absolute preventive of strikes but that it will restrict them to only a very small percentage of cases. The plan provides that no strike shall be instituted pending the decision of the wage board or commission, and after such finding is made the employees would be in honor bound by a previously required consent to abide by any decision reached. Should they repudiate this consent and strike, the act would not be considered a penal offense but they would be subject to the force of public opinion and would have no further standing before the commission.

At the hearing on Feb. 7 the only speaker was Samuel Gompers, president American Federation of Labor, who vehemently opposed any legislative action for the restriction of strikes. He admitted that he would favor the commission's plan if it were voluntarily adopted by employers and men, but said that no legal restrictions would be of any avail in prohibiting employees from quitting work if they so desired. Mr. Gompers averred that no strike-prevention laws anywhere in the world had accomplished their stated purpose. He denied that machinery set up according to the commission's plan would have provided the benefits that were secured by workers in the past through strikes and arbitration compromises. In closing he stated the general position of organized labor in these words:

"We will oppose the proposal step by step and will not yield one inch in opposing it during all its progress. We will fight it in the courts, and, if beaten there, we will exercise our God-given natural right, the law notwithstanding. You may make us lawbreakers possibly, but you are not going to make us slaves."

The hearing on Feb. 8 was given up to utility representatives. E. A. Maher, Sr., president Third Avenue Railway, stated that he personally was in favor of collective bargaining, but that he did not believe in bringing outside interests into the question, *i.e.*, foreign labor leaders and others not interested in railway operation, as are the companies and the commission. He told how his company expects to broaden the scope of its employees' mutual benefit association so the employees can take all questions up with the management and reach an adjustment. Mr. Maher said that the wage-board plan would not prove successful unless the decision of the board were final, for the employees would insist on an appeal in every case. Moreover, he felt that the matter of wages would better be left entirely to the company, and the commission from its records could easily check the company's veracity if it asserted at any time that it could not afford to pay higher wages.

John Beaver, receiver Second Avenue Railroad, thought that employees would strike, law or no law, if they so desired. T. S. Williams, president Brooklyn Rapid Transit Company, was not able to attend the hearing, but he stated in a communication that the plan of the commission would result only in unrest and dissatisfaction, for it did not presuppose a natural and spontaneous co-operation between management and men but tried to create concord by legislative fiat. Had the proposed plan been in effect last summer at the time of the metropolitan strike, Mr. Williams said, the company could not have maintained such peaceful relations with its men as it did simply through its policy of intelligent and fair co-operation.

In a similar communication T. P. Shonts, president Interborough Rapid Transit Company and New York Railways, stated that he believed in the right of the public to continuous service, the right of collective bargaining, the right to use contracts of service, the right to prohibit strikes pending investigation, the right of the company to maintain discipline and the right of individual employees to leave the service before the end of their contracts with the consent of the company or at the order of the commission. He thought, however, that collective bargaining through the company's internal brotherhood was more in the public interest and the employees' interest than bargaining through outside unions. Furthermore, he did not believe that the commission should control wages, hours and working conditions, for it would be both public prosecutor and judge in any case. The adjustment of grievances, he thought, should be left entirely to the company and the employees' organization. In regard to stopping work, Mr. Shonts suggested that if any considerable number of employees give written notice to quit or to demand changed conditions or wages, or if the employer gives written notice of an intention to change wages or conditions, the Public Service Commission should forthwith ask the Appellate Division to appoint three arbitrators to determine the controversy, the commission to appear on behalf of the public. The decision, when confirmed, should be binding for a period of from one to three years, and severe penalties should be inflicted upon the side disregarding the finding.

COMMUNICATIONS

Reuse of Existing Rail

AMERICAN RAILWAYS COMPANY
PHILADELPHIA, PA., Jan. 31, 1917.

To the Editors:

I wish to emphasize, if possible, the importance of the matter covered in the article by M. E. Stark, appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 13, page 80, under the caption "Prolonging the Life of Old Rail." In this article he took up the possibilities of reusing existing rail in track reconstruction.

At the present time many small properties find it impossible to get new rail at any price, and Mr. Stark's article opens up a line of thought which cannot but be advantageous even to larger railways. We are undoubtedly required to do a great deal of work which present market conditions and prices make burdensome. If a careful study is made it will often be found possible to reuse rail where such reuse in normal times would not be advisable.

The very general use of welders and grinders, and the improvements in joint and tie-plate practice also change the aspect of this particular problem. The problem seems to be to get 100 per cent wear, not only from our track materials but from all of the items that go to make up a railway property.

Economies worked out to-day under necessities of abnormal conditions cannot but produce still greater savings when conditions return to normal.

C. G. KEEN,
Engineer of Way and Structures.

Classification of Motor Trucks

BAY STATE STREET RAILWAY COMPANY
BOSTON, Feb. 6, 1917.

To the Editors:

It has been recognized for some time that a standard classification for trucks and car bodies, as well as for motors and other equipment, would be very desirable if it could be brought about. For this reason I am much interested in the article by Mr. Bullock in your last week's issue. In my opinion this is a subject which could very properly be taken up for consideration by the A.E.R.E.A. jointly with the manufacturers.

E. W. HOLST,
Mechanical Engineer.

PITTSBURGH RAILWAYS COMPANY
PITTSBURGH, PA., Feb. 7, 1917.

To the Editors:

In the article by S. A. Bullock of the Baldwin Locomotive Works advocating the use of a uniform system of symbols for defining the various classes of electric railway trucks, there has been opened up a subject which is timely and of interest to all equipment men. Mr. Bullock's proposed plan of classification at least provides a nucleus about which may be built a system which should include all types, classes and manufacture of trucks. Whether the three subdivisions of the proposed classification include all the essential characteristics necessary to designate properly all types is debatable, but this criticism is merely a question of detail and not fundamental. To illustrate, would it not be as desirable to differentiate between the equalizer-bar type, arch-bar type and plain yoke type as well as to express the characteristics outlined by Mr. Bullock? On the other hand, if all of the outstanding characteristics of the multitudinous design of trucks we have now with us are included in the same system of classification, it then may become so cumbersome as to defeat the purpose for which it was designed.

However, the need of a suitable system of classification must be apparent to all, and I believe the equipment committee of the Engineering Association could, with profit to all, include the study of such a system among its assignments of subjects.

F. R. PHILLIPS,
Superintendent of Equipment.

Compulsory Investigation Favored

Committee of National Chamber of Commerce Reports Almost Unanimous Vote on Its Strike Referendum

AT the fifth annual convention of the Chamber of Commerce of the United States, which was held in Washington on Jan. 31 and Feb. 1-2, the three main topics were the railroad situation, national defense and preparation for conditions after the war. The first topic was of most direct interest to electric railways, on account of the presentation of a committee report in favor of compulsory investigation of labor disputes on interstate carriers prior to strikes or lockouts. Strong action, however, was taken along other important lines, for the convention endorsed preparedness, the Webb bill and daylight saving, reaffirmed its stand for a national budget and pledged the business interests of the country to support the President in any eventuality.

The railroad committee reported on Jan. 31 that since its appointment in November, 1916, it had studied the Towne plan, which, as noted in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1916, page 692, contemplates taking from employees by contract all right to strike under any circumstances; and also the McClellan plan, indorsed by the Seattle Chamber of Commerce, which seeks to establish a wage-fixing board. The committee stated that it recognized as a matter of principle that when a man enters the railroad service, he by that act should surrender the right to join in concerted action to paralyze that service. It hoped for the ultimate adoption of this principle, but for the present it limited its recommendations as set forth in its referendum.

The major proposal covered by the referendum to members of the Chamber of Commerce provided for a full public investigation before any strike or lockout should be attempted on interstate railroads. To this were added two proposals designed to render the first more effective—*i.e.*, that upon any investigation or arbitration board the employers and employees should have equal representation and the public a majority representation, and that a permanent statistical division of the Interstate Commerce Commission should be established to compile statistics on labor and other subjects for the use of arbitration boards in future railroad controversies. The vote on these questions, which closed Jan. 30, 1917, was in no case less than 94 per cent favorable. This was the largest affirmative vote ever reported by the Chamber of Commerce.

At the same session W. D. Hines, chairman of the board of directors Atchison, Topeka & Santa Fé Railway, stated in an address that continuity of transportation cannot be relied upon so long as the government permits service to be interrupted at the pleasure of the railroad brotherhoods. Mr. Hines said that the present absence of strike talk on the part of the brotherhoods is merely temporary, in the hope that Congress may be induced to let the session end without legislation to protect the public's interest. After the Con-

gress closes and the Supreme Court decides the Adamson act test case, the country will wake up to the purpose of the brotherhoods to have their own way or paralyze interstate transportation.

In a notable address on "Industrial Relations" on Feb. 1, Harry A. Wheeler, first president of the national chamber, took the point of view that the present industrial situation is a condition involving the conflict of two forces; that a complete adjustment between these forces should not be expected, and that the conflict will be carried on by both sides with increasingly efficient organized forces. This being so, Mr. Wheeler stated that in the interest of national safety these forces must come under some measure of control, for while the law may be powerless to harmonize conflicting human relationships, it can and must control the operations of known forces which, if allowed to continue without restraint, will trespass upon public rights and affect the public welfare. The action of organized labor heretofore has been within the trade or community or limited geographical area; but during the summer of 1916 it laid bare its claim to national influence and made apparent the necessity for national regulation. The public interest, as a third and now expressable interest in industrial disputes, said Mr. Wheeler, was born last summer and will hereafter demand its rightful voice in every national controversy.

Besides the report of the railroad committee, constructive reports were submitted along various lines. For example, the committee on daylight saving recommended that clocks in the United States be set one hour ahead of the standard time. If that plan should not prove feasible, it proposed that the clocks should be advanced one hour on April 1 each year and turned back on Nov. 30. Whichever plan should be adopted, however, the committee believed that the change should occur simultaneously in all parts of the country and that Congress should act in the matter. The committee on commerce proposes the addition of four closely related new functions in the Department of Commerce, as follows: To find out what it costs to do business in the United States; to deduce from collected facts sets of reasonably attainable standards for the various items of expense in different lines of business; to circulate information concerning the methods of the more efficient, and to work out better methods than those actually found in use. The committee on statistics and standards recommended the creation of a federal commission for the survey of all census statistics, and a resolution to this effect was adopted.

The main resolution passed at the end of the convention related to preparedness and the pending revenue bill. It approved the program of preparedness, as indorsed by the chamber's referendum and by various resolutions, and also pledged the support of the chamber to any just and reasonable taxation to support preparedness. It protested against the inequitable and discriminatory taxation of the pending revenue bill providing for a tax on corporations and co-partnerships, and, finally, declared that the business men of the country would approve of any bill drawn along the lines of fairness "so that every citizen would pay his just share of the tax."

Position-Light Signals

At a meeting of the New York Section of the Illuminating Engineering Society, held on Feb. 8, 1917, A. H. Rudd, signal engineer Pennsylvania Railroad, presented a paper on "Position-Light Signals for Railroad Service." He described the development and application of position signals and told especially of many difficulties encountered with position-light signals on the company's experimental line from Philadelphia to Paoli, and how they were overcome. One difficulty was to devise a means to maintain the lamp in a position so that the filament would have an exact relation to the lens. Another difficulty was to secure lenses that would not reflect the sunlight at certain times in such a way as to give false indications. The speaker said that enginemen were now almost unanimous in their preference for these signals and that he believed they would come into more general use since they fulfill very satisfactorily the requirements peculiar to the lines where they are installed.

AMERICAN ASSOCIATION NEWS

Manufacturers and Railway Men Confer on Overhead Specification

A sub-committee of the line material section of the Associated Manufacturers of Electrical Supplies and a sub-committee of the committee on power distribution of the Engineering Association met in Chicago, Feb. 6 and 7. The conference was for the purpose of harmonizing the differences between the Engineering Association's specifications for overhead material, as set forth in the 1916 report, No. 304, and the products of the several manufacturers. The two days were consumed in the consideration of malleable fittings, and agreement was reached on practically all differences. A second meeting to revise the specifications for bronze castings, wood and porcelain strain insulators, pole-line fittings, etc., will be held in Chicago on Feb. 26 and 27.

At the conference the Engineering Association was represented by E. J. Blair, Chicago, chairman; R. H. Rice, Chicago; A. Schlesinger, Indianapolis, Ind. The manufacturers' representatives were C. C. Peck, Ohio Brass Company, Mansfield, Ohio, chairman; James H. Drew, Indianapolis, Ind., and William Schaake, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Section No. 11 Organized in Toledo

A statement regarding the proposed organization of a four-sided joint company section on the property of the Toledo Railways & Light Company was given in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 20. The section was organized as scheduled on Jan. 23 under the chairmanship of H. H. Ross, railway engineer, starting with an enrollment of ninety-eight men. The first speaker on the program was F. R. Coates, president of the company, who delivered an address in which he promised active co-operation with the new section. The Rail-Light Band, organized under the direction of S. J. Derge, assistant general manager, then played several selections.

Talks were given by out-of-town visitors. E. B. Burritt explained the ideas and ideals of the American Association. He was followed by G. B. Muldaur, field secretary National Electric Light Association, who spoke on "The Function of a Company Section." E. J. Blair, electrical engineer Chicago Elevated Railroads, represented the committee on company sections and individual membership, bringing greetings from his own section. Finally, D. H. Daskill, secretary National District Heating Association, addressed the section on public and interdepartmental relations.

Secretary H. Friede reports a fine spirit at the opening meeting, which took tangible form in the large enrollment mentioned.

Practical and Economical Solutions of Problems in

EQUIPMENT AND ITS MAINTENANCE

Utica Interurban Car with Air Operated Doors—Is There a Perfect Trolley Wire?—Trolley Wire Erection Costs, III—Ballast-Unloading Trestle Made of Ties—New Apparatus and Useful Suggestions

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Quick-Loading Interurban Cars

On the Utica Lines of the New York State Railways Equipment for Six-Car Train Service Has Been Designed with Inclosed Vestibules and Drop Platforms

BY J. R. AYERS
Master Mechanic New York State Railways, Utica Lines

The New York State Railways, Utica Lines, has recently placed in service twelve single-end interurban cars that were specially designed to give entrance and exit facilities equivalent to those commonly obtaining with city cars. Drop platforms with folding doors and steps have been provided at both ends of the car, and bulkheads have been omitted. This arrangement was adopted to permit rapid loading and unloading at points of congested traffic, the service involving a run of about 10 miles without stop to a point where more than 60 per cent of the passengers are discharged. The cars are run in trains varying in length from two to six cars, the composition of each train varying from all motor cars to half motor cars and half trailers.

An all-steel, arch-roof design was adopted in accordance with the general tendency toward these features displayed in modern car construction, and the bodies, which were built by the Cincinnati Car Company, possess several novelties in detail in addition to those already outlined. The general dimensions are as shown in the accompanying table.



INTERIOR VIEW OF INTERURBAN CAR WITHOUT BULKHEADS

Length over all	49 ft. 8 in.
Length over dash	48 ft. 8 in.
Length over body	38 ft. 8 in.
Extreme width at belt rail	8 ft. 5 in.
Height from rail to trolley boards	12 ft. 1½ in.
Height from rail to first step	16½ in.
Height from first step to platform	14 in.
Height from platform to car floor	11 in.
Height of coupler center from rail	20 in.
Post centers	32 in.
Width of entrance door opening	38½ in.
Truck centers	26 ft. 8 in.
Width of seats	38 in.
Width of aisle	21 in.
Seating capacity	56
Weight ready for service	54,000 lb.

Inside of the car body all panels are insulated with cork covered with linoleum. Front and rear dashes have cork insulation only, with interior paneling of steel to form window pockets. The roof is steel riveted to the one piece T-iron carlines which also form the side posts. This surface which is finished white forms the inside finish of the car. The outside of the steel roof is insulated with 1-in. cork, covered with 6-ounce duck. Two thicknesses of 13/16-in. yellow pine, covered with ¼-in. Battleship linoleum make up the floor.

A Peter Smith forced-ventilation hot-air heater, which has a cold air intake arranged so as to take air



FOUR-CAR TRAIN FOR INTERURBAN SERVICE REQUIRING RAPID-LOADING FACILITIES

from an opening in the bottom of the vestibule, is installed, and the interior lighting system comprises one circuit of six 94-watt Mazda lamps arranged with a selector switch.

The seats, which were designed to the railway company's specifications and manufactured by the Hale & Kilburn Company, are of the non-reversible type, with removable backs and Pantasote upholstering.

Other specialties are combination ventilating and lighting fixtures, illuminated roller signs, Ohmer registers, combination arc and incandescent headlights, Peacock staffless brakes, Root air-operated snow scrapers, Eclipse Frisco-type fenders, and Westinghouse 6-T signal switches for train operation. The passenger signal push button is of the trigger type.

At the forward end of the car the doors, which are operated by the motorman, are inward folding and work in conjunction with the step. At the rear the folding doors are operated by Chicago Pneumatic door engines. These doors also are inward folding, and the control mechanism is so arranged that the doors can be operated by the conductor from any point in the car. This is done by a control rod which runs the full length of the car in the same bracket as the bell cord, whistle cord, register cord, etc. As before mentioned, there are no bulkheads in the car, the motorman being amply protected from the light at night by means of three curtains.

During train operation the front vestibules are used by passengers as standing room. Therefore provisions are made, by means of small steel box, to lock up fuses, controller key, brake-valve handle, coupler unlocking valve handle and air-scraper handle. These operating accessories are locked up at all times, except in the cab of the motorman actually operating the car. As the box is provided with standard switch lock, all motormen and conductors have keys to it.

TRUCKS, BRAKES AND ELECTRICAL EQUIPMENT

Standard Baldwin trucks equipped with M.C.B. journal boxes, EB axles, and inside hung motors are used, but the height of the underside of the floor above the rail of 40 in., together with 35-in. wheels and the requirements of 33 ft. radius curves, made it necessary to design a special central brake beam.

Westinghouse AMM brake equipment with D-2-H compressor and M-22-A brake valve have been provided, this brake valve permitting six-car train operation. Westinghouse G-2 automatic car and air couplers also are used. For these couplers the uncoupling valves are located in each end of the car. The valve is so designed that it can be operated only by a specially shaped handle, and the latter can be removed only when the coupler valve is in the coupled position, this handle being always kept in the lock box in the cab.

The electric equipment consists of four Westinghouse 306-CV motors arranged for ALM control. As this type of control requires only seven-wire control cable for operation, the nine-wire train and jumper cable, which is standard on this property, permits operation of the signal switch wire, and the feed wire for lights and heater in trailers without any additional receptacles and jumpers.

The cars were equipped by the railway company's force, and special attention was paid to accessibility for inspectors to all parts of equipment. Everything that would have a tendency to reduce maintenance was given careful consideration. For example, valves that are liable to give trouble and can be repaired or cleaned by inspectors, have been arranged with unions on both sides so that they may be easily removed when this is necessary in order to make repairs.



GENERAL VIEW SHOWING INCLINE OF BALLAST UNLOADING TRESTLE

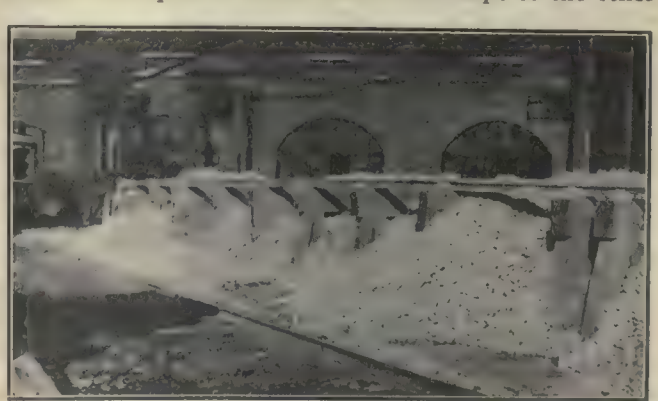
Temporary Unloading Trestle to Facilitate Handling of Ballast

BY E. R. DIKE
Engineer Maintenance of Way Chattanooga Railway & Light Company, Chattanooga, Tenn.

On nearly all of the construction and reconstruction work done by the Chattanooga Railway & Light Company, Chattanooga, Tenn., during the past six or eight years it has been practicable to pull the hopper cars in which the crushed limestone ballast was shipped to the point of use and to dump the ballast in the track, thus avoiding handling. On a recent job on Oak Street, however, which involved the reconstruction of 1 mile of double track and the use of 3000 cu. yd. of ballast, this was impossible because the ballast cars could not be pulled for several miles through the residence section of the city, and in addition a ten-minute to five-minute headway of passenger traffic gave insufficient time for unloading. This necessitated the dumping of the cars in the yard and reloading the ballast into work cars for final distribution.

To dump this ballast upon the ground or onto a platform level with the rail and to attempt to handle the ballast with reasonable cost and speed was impossible and gave rise to the scheme pictured herewith. The ideal system would be to erect a suitable trestle over storage bins and to have track for work cars near the bins. Such an installation was not practical in this instance for lack of space for the trestle and overhead room beneath the cables from the near-by power house.

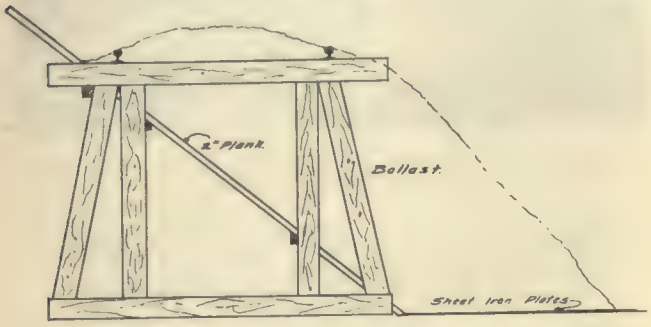
In the plan worked out and used with great success two tracks practically parallel were selected and one of them was raised by trestle bents made of ties to an elevation of about 6 ft. above the other track. Then a sloping floor, having a pitch of about 45 deg. and made of 2-in. oak plank, was constructed under the elevated track. The space from the toe of the slope to the other



CLOSE VIEW OF BALLAST IN STORAGE SPACE

track was floored with sheet iron covered with some old scrap plates such as are sometimes fitted to crossings. The grade of the incline was made about 5 per cent, and the work cars used to haul the ballast cars had no trouble in setting the latter upon the trestle.

As the dump doors on the cars are let down, the ballast runs out and assumes a position where it can easily be handled by the work-car crews. The empty



ELEVATION OF UNLOADING TRESTLE ARRANGEMENT

cars are switched out by gravity. The space for ballast holds about eight carloads of 25 yd. each, or approximately 200 yd. When six or eight cars a day or even more were being set into the yard, this arrangement made possible their immediate disposal, while by the ordinary method of unloading it would have been necessary to hold some of these cars until demurrage was due. This arrangement also made it possible to load and deliver the ballast to the work more quickly.

The Ideal Trolley Wire

The Author Reviews the Qualities of Different Materials and Outlines the Proper Service for Each

BY G. H. McKELWAY
Engineer of Distribution Brooklyn Rapid Transit System

It might just as well be said at the beginning that the ideal trolley wire is like the old countryman's "gi-raf-fee." "There ain't no such animal." The ideal wire should be low in first cost, should never wear out or break, should have a salvage value when taken out of service equal to that of new wire, and in addition, its conductivity should be 100 per cent. It is self-evident that no wire can fulfill all of these requirements, and the most that one can hope for is a wire that will approach them.

PROPERTIES OF METALS USED FOR TROLLEY WIRE

Only two metals can be seriously considered for trolley wire, viz., copper and iron. Other metals are used in the manufacture of the wire, but they are used only in the making of alloys of which the base is copper or iron. In practice the number of kinds of wire can be reduced to four; viz., copper, steel, bronze, and copper-clad, a physical combination of copper and steel. While "bronze" and "copper-clad" are sometimes considered as trade names by certain manufacturers, it should be understood that these names in this article do not specify particular makes of wire.

Although there is no wire that approaches steel in low first cost, it must be remembered that it is often the custom to use a steel wire of greater cross-section than would be considered for any of the others. Hence, while the cost per pound may be very low, the cost per foot is higher than if the usual cross-sectional area was used, although not as high as that of the other kinds of wire. It would be the most expensive per foot if of the same conductance as the other types, for a 1,000,000-circ. mil steel wire would be needed to take the place of a No. 0 copper wire. Such a wire is never used, however, the largest steel trolley wire that has ever been drawn, to the knowledge of the writer, being No. 000000, and the usual size is No. 0000. When the price of metals again becomes normal the prices per pound will approximate the following: Bronze, 21 cents, copper, 18 cents, copper-clad, 18 cents and steel, 7 cents.

It might be supposed that the values of the metals as salvage would be a certain proportion of their first cost, but this is not true. The copper and bronze wire decrease but little in value while the other two kinds lose in a much greater ratio. Copper scrap and bronze will be worth about 14½ cents, copper-clad wire only about 4 cents, while ½ cent will be a good price for the steel.

In ease of installation the copper wire is found to lead, but is closely followed by all three of the other types, among which there are slight differences. Bronze wire may take second place in this comparison, but there is little to choose between it and either of the others.

In conductivity the copper wire leads again, its relative conductivity ranging from 97 per cent of that of pure soft copper for hard-drawn wire of unusually good quality down to almost 90 per cent for an extra hard-drawn wire which has been used but very little. Ninety-five per cent is a good average figure and one that can practically always be met. The conductivity of bronze wire ranges from 85 per cent with a comparatively soft wire to 40 per cent, and will average about 45 per cent. Copper-clad wire has a conductivity varying from 50 per cent to 25 per cent, averaging about 40 per cent. That with less than 35 per cent is seldom used for trolley wire. The conductivity of the steel wire is only about 10 per cent.

DESIRABLE QUALITIES OF TROLLEY WIRE

Of the many qualities which enter into the manufacture of a good contact wire, the following are important: strength, ductility, hardness, stiffness, high elastic limit, resistance to arcing, high melting point, toughness, homogeneity and permanence of the original good qualities under wear. Tensile strength is an important item because of the severe treatment that the ordinary trolley wire receives not only from the elements, but also from the blows of "wild" poles. Occasional slow, heavy pulls are to be expected such as follow when a trolley wheel leaves the wire and the pole is pulled down with the wheel engaged in a span. Ordinary No. 00 hard-drawn copper wire will withstand a pull of about 5500 lb. before breaking. All three of the other types have about the same tensile strength which will average for wire of this size about 7800 lb.

The elastic limit of all of these wires is about 75 or 80 per cent of their ultimate strength. However, since the strength of the copper wire is much below that of the other three, it will break before any of the others have been strained enough to produce a permanent set.

Ductility and hardness might be considered as opposite qualities, yet no trolley wire should possess one in excess with the other negligible. The wire needs to be hard to resist the grinding action of the trolley wheels, which is sometimes great on sharp curves, yet it should have sufficient ductility to prevent breaks due to crystallization at ears, circuit breakers, crossings or other hard spots in the line. In order that the wire may not be too brittle, it is well to specify that when broken in the laboratory it will stretch at least 3 per cent in 10 in., with a maximum of 5 or 6 per cent. A soft wire will not only lack the strength of a harder one but will stretch after being installed and thus become too slack, especially in warm weather. This slackness might per-

mit the trolley wheel to ride on its flanges in the trough under a bridge structure due to its pressure upward on the wire.

While resistance to arcing might be considered as a minor virtue, nevertheless, much depends upon this quality, as is shown by the rapid wear and increased tendency to break evidenced in wire from which heavy currents are taken. This is true, for instance, on grades or at points where the cars are started. The troubles from this cause appear to be greatest with the steel wire and least with the bronze.

By high melting point is meant not merely the ability to resist high temperatures but the ability to carry heavy currents such as will flow through a grounded trolley wire without fusing or serious annealing. If the melting temperature was the only thing to be considered steel wire would have an advantage over copper in that their melting points are about 2500 deg. Fahr. and 2000 deg. Fahr. respectively. However, with the same currents flowing through the two wires the temperature of the steel will be much the higher owing to its higher resistance, so that the copper will melt later. It has been asserted that, owing to the higher resistance of the other wires, not so much current will flow through them as through the copper when they are grounded. This is true to a degree, but the current will not vary inversely as the resistance of the trolley wire because the trolley constitutes only about one-half of the circuit.

The tension test for trolley wire, regarding which there has been considerable discussion, has been retained because most engineers believe that it gives a better measure of toughness than any other test. The writer has never made, or seen the results of any tests of this character on steel or copper-clad wire, but the results of several hundred tests on copper and bronze wires show that the latter will stand almost twice as many twists as the former, the figures for 10 in. being approximately forty and twenty respectively.

By homogeneity is meant the sameness of characteristics in all parts of the wire. This quality cannot exist in copper-clad wire, but it will be found in both steel and bronze wires and perhaps in copper wire. It is generally believed, and until a short time ago the writer thought universally accepted, that with a hard-drawn copper wire the greatest strength was to be found in a thin skin of metal on the outside of the wire and that the inside of the wire was but little stronger than soft copper. Tests have been published to confirm this opinion, although it has been said that the rolling action of the trolley wheels tended to harden the metal on the inside as the outside was worn off. A short time ago, however, one of the large wire companies made tests which showed that the action of the drawing had its effect entirely through to the center of the wire. Successive skins were removed, both by cutting and by etching with acid, and the wire on the inside stood up under the same tests as that on the outside; the appearances of both under a microscope being the same.

It is important that the wire shall not only begin its service in good condition, but shall retain its good qualities. In this respect the bronze wire appears to have an advantage over the others. Tests made on copper wire cut from lines that have been in service for a number of years show that the copper has become virtually the same as that in soft drawn wire. Steel wire, too, will show the annealing effect of heavy currents, although to a lesser degree than copper, and in addition, after being up in the air for a time the steel wire will begin to rust. To prevent this it has been proposed to use galvanized wire, but the writer does not know that this has ever been done. One company attempted to resist corrosion by painting the wire. The writer cannot speak with authority as to the effect of heavy currents on copper-clad wire, but it is logical to assume that the effect would be the same as with copper or steel wire since it is composed of both metals. Another change which occurs to the copper-clad wire is a greater increase in resistance due to the wearing away of the copper of high conductivity on the outside, leaving only the steel core. Tests made on bronze wire, after years of use, show that this wire retains practically the same qualities that it had when put up.

PROPER SERVICE FOR DIFFERENT MATERIALS

From the foregoing it is seen that no wire possesses all of the good qualities. The engineer must decide in each case which qualities are most important for the line under consideration and purchase the wire that best embodies them, instead of merely following the practice of some other road which may be operating under very different conditions.

With long, comparatively light lines, where there is little or no feeder in multiple with the trolley wire, conductivity will be the important consideration and therefore copper would naturally be used. On the other hand, where the service is very frequent and heavy, necessitating the use of heavy feeders and frequent side feed taps, as for instance in the downtown sections of large cities, strength, toughness and all other qualities which will cut down the number of breaks would point to the adoption of either the bronze, copper-clad, or steel wire. Under trough work, where there are hard spots at every hanger, with the ordinary construction the steel wire will not last as long as the other two, as it cannot withstand the constant hammering. Steel wire is also at a disadvantage where heavy currents are required, as in freight or train service, since it will not resist the arcing as well as the bronze or copper-clad wires, especially the former. Copper wire will withstand the effects of the arcing under such service, but has not the needed physical strength.

With high voltages and the resultant reduction of current and lessened percentage of line drop, the steel wire comes into its own realm, more particularly on lines of light traffic. It will be recalled that the New York, New Haven & Hartford Railroad was the first to use the steel contact wire, but owing to its heavy service, it has more recently adopted bronze wire for the latest construction and for gradual replacement of steel. The fusing, burning and corroding of steel were potent factors in making this improvement despite the much higher cost of bronze.

Pliers Insulated for 10,000 Volts

Pliers of tool steel, insulated for 10,000 volts, are being made by the Rubber Insulated Metals Corporation, Plainfield, N. J. The insulation is a rubber compound that will not only give high-voltage protection, but it has satisfactory wearing qualities as well. It is said that the bond between the rubber and the metal is such



PLIERS WITH RUBBER INSULATED HANDLES

that after some severe tests the insulation showed no tendency to loosen from the handle. Another feature of this tool is that each bears the stamp of approval of the Electrical Testing Laboratories, Inc., of New York City, showing that it has passed satisfactorily a test at 10,000 volts.

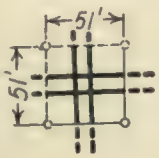
Cost of Erecting Overhead Work—III

(From the records of a large Eastern company)

The following is the third group of a series of diagrams with figures to show actual costs of erecting the various types of overhead construction described under conditions of light, ordinary and congested traffic. The first and second groups in this series appeared in the issues for Jan. 20, page 127, and Jan. 27, page 173. The remaining groups will be published in later issues.

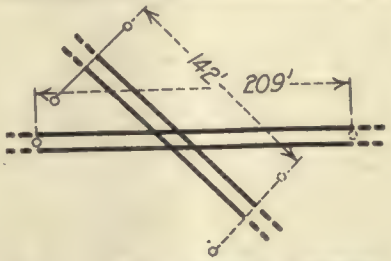
LABOR REQUIRED FOR CONSTRUCTING VARIOUS TYPES OF OVERHEAD TROLLEY SPECIAL WORK UNDER VARIOUS TRAFFIC CONDITIONS

Double track crossing double track, angle 90 deg.



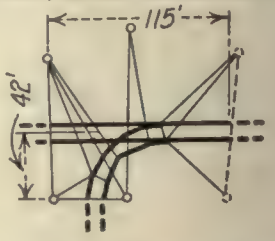
No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
18	$15.95	$6.60	$19.14	$7.92	$22.33	$9.24

Double track crossing double track, angle 45 deg.



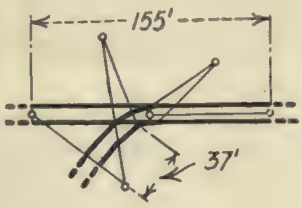
No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
19*	$18.15	$13.20	$21.78	$15.84	$25.41	$18.48

Double track, left-hand branchoff, angle 90 deg.



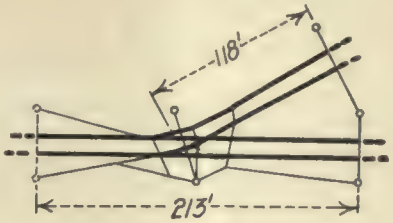
No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
20	$23.93	$9.90	$28.71	$11.88	$31.90	$13.20

Double track, left-hand branchoff, angle 45 deg.



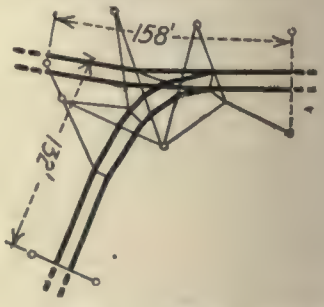
No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
21	$23.93	$9.90	$28.71	$11.88	$31.90	$13.20

Double track, left-hand branchoff, angle 30 deg.



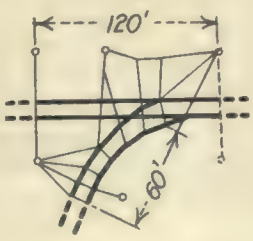
No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
22*	$29.04	$21.12	$36.30	$26.40	$45.38	$33.00

Double track, left-hand branchoff from curved main line, angle 60 deg.

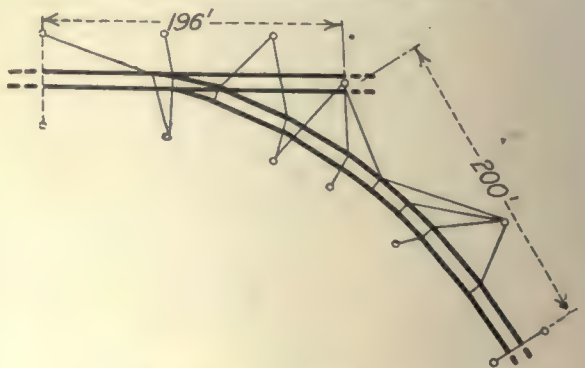


No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
23*	$36.30	$26.40	$43.56	$31.68	$50.82	$36.96

Double track, left-hand branchoff, angle 60 deg.



Double track, right-hand branchoff, angle 60 deg.



No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
24	$25.52	$10.56	$30.31	$12.54	$36.69	$15.18

No.	Light		Ordinary		Congested	
	Labor	Trucking	Labor	Trucking	Labor	Trucking
25*	$36.30	$26.40	$45.38	$33.00	$54.45	$39.60

*Trucking includes cost of extra reel truck. None of the figures on this page includes cost of superintendence and engineering.

Storage, Handling and Filtering of Insulating Oils

Too little attention probably has been given to the proper handling of insulating oils by those handling oil-insulated electrical apparatus. The engineers of the Westinghouse Electric & Manufacturing Company advise attention to the following considerations:

Insulating oils are generally shipped either in the tank with the apparatus, in soldered tin cans, or in steel drums provided with screw bungs which are sealed before shipment. Oil in unsealed drums should be tested before use. It is advisable to store drums in a closed room, but if they are stored out of doors, protection from the weather should invariably be provided. They should always be placed on their sides in storage, for when they are turned up on end, water can collect in the head around the bung.

All apparatus should be thoroughly dried before filling, and during the actual transferring of the oil every care must be taken to prevent moisture from getting into either the oil or the apparatus. A drum of cold oil when taken into a warm room will "sweat," and the resulting moisture on the outer surface may mix with the oil as the latter flows from the drum. Before breaking the seal, therefore, the drum should first be allowed to reach room temperature. All vessels used for transferring the oil should be absolutely dry and free from metallic or carbonaceous particles.

Immediately before placing the oil in the transformer or switch tanks particles of foreign matter, scale, etc., should be removed. Such may have adhered to the interior of the drum too firmly to be removed by the washing and drying which the drum received at the oil refinery before filling, but may have become loosened by the continual swashing of the oil during transit. This material can be conveniently removed by using a funnel of large size, the top of which is covered with a filter made of two layers of any ordinary, finely woven, cotton cambric that has been thoroughly washed and dried to remove the sizing. If slightly warm, the oil will pass through this filter more rapidly. The funnel may be made to discharge directly into the tank of the electrical apparatus, otherwise the oil must be returned to an empty drum which is known to be thoroughly clean and dry. The thoroughness with which the filtering has been done may be determined by measuring the dielectric strength of the oil with a testing cup and spark gap.

Hints on Blasting Hardwood Stumps

Stumps of maple, beech, birch, hemlock and basswood, commonly known as hardwood stumps and found in the northern part of the country, are removed by blasting with dynamite. Detonation is done with cap and fuse, as the use of a blasting machine is rarely required. The principal reason for using dynamite is that of economy. This requires that the proper amount of charge be placed under the center of the stump, or the point of greatest resistance.

The proper dynamite for hardwood stumps is a medium-slow powder of 40-per cent strength. Dynamite of 20-per cent strength is sufficient for old stumps on clay soil, while for green stumps on lighter soil 60-per cent strength is recommended. A hole for the charge is made with a piece of steel shafting about 6 ft. long with one end drawn to a point. The other end is flattened like a chisel to cut small roots. Such a bar, weighing about 25 lb., can be used to strike the stump to "sound" it, and thus help to determine the proper amount of charge.

Wigwag Signal Used at Highway Crossings

The Hall Switch & Signal Company is putting on the market an oscillating type of highway crossing signal, or flagman. In its method of indication, this signal is somewhat similar to a wigwag signal of another make described in the issue of the ELECTRIC RAILWAY JOURNAL for July 22, 1916, page 151. It is at present installed on several Eastern steam roads, but is equally applicable to electric roads.

The electrically-operated crossing flagman appears as shown in the accompanying illustration. It has a case with two circular openings of unequal sizes, fitted with glass, through which the indications are displayed. Danger is indicated by two red disks operated by a signal instrument inside the case. The disks travel in arcs of a circle and oscillate simultaneously in opposite directions. They are so placed that as they pass the central position they coincide with the openings. The larger disk, as it oscillates past the large opening, indicates danger by day. A lamp is mounted on the back of the case so that the light is seen through the small opening. This gives the warning at night as the smaller disk passes in front of it. More than one small opening with lamps can be provided to give a series of red flashes for the night indication.



WIGWAG SIGNAL FLAGMAN SHOWING CLEAR

Should the apparatus become deranged, the danger indication is automatically displayed as the disks assume positions opposite the openings. The signal light then appears red continuously and during the day the larger disk is visible through the large opening. For a clear indication the disks are held out of sight to leave the white light visible and the large opening clear. The signal is also designed to display indications in both directions, and is used with gong or horn if desired.

According to information compiled recently by the Government Forest Service, 102 treating plants, operating throughout the United States, report a total of 125,639 poles treated in 1915. This is estimated to be about one-half the actual number subjected to treatment, since a large number given a brush treatment are not reported. The principal preservative used was creosote oil, and the average absorption was about 11 lb. per cubic foot. About 85 per cent of the poles treated were yellow pine, while western red cedar and Douglas fir largely made up the remainder.

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

Petition Before Commission

Philadelphia Presents Petition to Public Service Commission—P. R. T. Presents Full Text of Its Rapid Transit Offer

Virtually no opposition was offered when the application of the city of Philadelphia for permission to construct the proposed high-speed subway and elevated system was heard by Public Service Commissioner James Alcorn at Harrisburg recently. Although the entire high-speed system, with the exception of the Darby "L," was under consideration, only one modification in the plan mapped out for it by the city authorities was asked for, and that was a comparatively unimportant one. City Solicitor John P. Connelly, who, with Transit Director William S. Twining, represented the city of Philadelphia, agreed that this modification should be made, affecting as it did one of the principal hotels of the city. Now that the formality of holding a hearing of the city's application for a certificate of convenience has been gone through before a member of the Public Service Commission, Director Twining can at once let contracts for the continuance of the construction of the high-speed lines under the present plan, unless the commission should itself decide upon further modifications, which is considered extremely unlikely. The application did not cover the proposed Darby "L" because the plans for it have not been completed, nor did it include the Frankford "L" south from Callowhill Street for the same reason.

The complete text of the Philadelphia Rapid Transit Company's offer to lease and operate the city's high-speed lines has been delivered to Mayor Smith in the form of a lease ordinance. Except as to a few modifications to provide for contingencies, the amplified copy conforms to the original plan presented to the city on Dec. 20, and noted at length in the ELECTRIC RAILWAY JOURNAL of Dec. 30, 1916, page 1359.

BONDS TO BE ISSUED

The draft of the ordinance reveals the fact that the company proposes to raise the money for equipping the lines by an issue of first-mortgage gold sinking-fund bonds. It has been estimated that it will require $19,000,000 to equip the lines, and this, it was believed, would be raised with the aid of the Union Traction Company, by assessment on the stock of that corporation, making it full paid. Such a contingency is provided for, but it is specified that the money which shall be raised by such payments on the stock of the Union Traction Company is to be used for additions, betterments, refunding and other proper capital expenditures, under the provisions of the 1907 contract between the city and the Rapid Transit Company.

Bids for the construction of the subway delivery loop were opened on Feb. 6 by Director Twining of the Department of City Transit. One of the bidders was a new company, the Philadelphia Subway Construction Company, in which State Senator Edwin H. Vare is said to be the dominating figure. One of the incorporators is Norman G. Degnon, of the Degnon Contracting Company, New York, N. Y., and another is George D. Grover, an engineer in Mr. Vare's employ. The low bidder, apparently was the Keystone State Construction Company, which is controlled by State Senator James B. McNichol, the political rival of Mr. Vare. On contracts No. 201, 202 and 203 the bids of the Keystone company were $1,575,000, $2,496,000 and $1,713,000, a total of $5,784,000. This company is already engaged on contract No. 1, which covers the City Hall section of the Broad Street subway.

The Public Service Commission will hold a hearing on the Philadelphia subway and elevated applications in Philadelphia on Feb. 15.

Hearing on the Frontier Railway

Case Adjourned Pending Decision as to Merits of Application to Have Certificate of Convenience Revoked

The plans of the Pennsylvania Railroad and the Delaware, Lackawanna & Western Railroad to use the Frontier Electric Railway between Buffalo and Niagara Falls as an extension of their freight trunk lines were revealed before the Public Service Commission for the Second District of New York at Albany, on Feb. 7. H. A. Taylor, attorney for the Erie Railroad, filed an application for the revocation of the certificate of convenience and necessity granted to the Frontier Electric Railway by the commission. The case developed into a struggle between the Pennsylvania Railroad and the Delaware, Lackawanna & Western Railroad on the one hand and the Erie on the other for the business of the rich, industrial territory at Niagara Falls and possibly future connections with the proposed new transcontinental line of the Canadian Northern Railway. Chairman Van Santvoord of the commission said:

"I had no idea from the testimony presented that this was to be a fast freight line when I voted to give it permission to cross certain highways. All the testimony was to the effect that it was to be a suburban and electric passenger line."

He then asked the representatives of the Pennsylvania and the Lackawanna railroads as to whether the proposed line was to be used for freight. In reply, J. G. Rodgers, superintendent for the Pennsylvania Railroad, said:

LOCAL FREIGHT LINE PROPOSED

"It is certainly to be a local freight line with the possibility of later making it part of a through freight line to Canada."

Thereupon the chairman of the commission said:

"We have never entered into any inquiry as to the necessity of another freight line. In fact, this commission recently found that there was no public necessity for a similar freight-carrying project."

L. L. Babcock, attorney for the Delaware, Lackawanna & Western; Morris Cohn, for the Frontier Electric Railway, and E. G. Connette, president of the International Railway, Buffalo, argued at length to the effect that the Frontier Electric Railway, incorporated under the railroad law, has always been both a freight and passenger road, and so always made its applications.

Mr. Van Santvoord said:

"Irrespective of this controversy over business between the railroads I do not believe that we should permit these railroads to extend a new freight trunk line to the Canadian border without full notice to the people of that territory."

The commission indicated that the present application of the Pennsylvania Railroad and the Delaware, Lackawanna & Western Railroad to buy into the Frontier Electric Railway would not be disposed of until the commission had been satisfied of the necessity for the trunk freight line. The hearing was adjourned pending a decision by the commission as to the merits of the Erie Railroad's application to have the certificate of convenience revoked.

The hearing on Feb. 7 was a continuation of the one commenced on Jan. 15 before the commission on the application of the steam railroads mentioned previously for permission to purchase the capital stock and the right-of-way of the Frontier Electric Railway between Buffalo and Niagara Falls, parallel and contiguous to the high-speed line which the International Railway now has under construction. The previous hearing was reported in the ELECTRIC RAILWAY JOURNAL for Jan. 20, page 135.

Progress in Chicago Plans

Bills for Enabling Legislation to Make Financing Possible Approved by Committee

Means for obtaining enabling legislation to carry out the plans of the Chicago Traction & Subway Commission rapidly took definite form at the meeting of the local transportation committee of the City Council on Feb. 5. The committee approved with a few changes the draft of the McCormick bill for "home rule" for Chicago utilities, outlined briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 27. The committee also approved a bill for the consolidation of the elevated and surface lines. A provision is written into the proposed consolidation bill which will prevent the owners of a few shares of stock from holding up the consolidation plans, reservation being made that the minority stockholders who might object to consolidation shall have the right to go into court and obtain cash for such real value of the securities as the court might fix.

Walter Fisher, special counsel for the committee, recommended the granting of a thirty-year franchise to the new consolidated companies, with provision written into the ordinance for a twenty-year extension of the franchise, provided the city did not take over the property at or before the expiration of the thirty-year period. The city will have the right to take over the property by paying the unamortized investment after such part of the franchise period has elapsed that the investment will be a certain percentage retired. This percentage is under consideration but will probably be fixed at 50 per cent, which would mean at the end of thirty years, provided all expenditures were placed in revenue-producing properties. The securities issued, by this plan, will not necessarily expire in 1947, as the ordinance will provide that the city assume the unpaid balance whenever it takes the property over. This will make financing easier. Mr. Busby is still holding out for the indeterminate franchise and this is also favored by Mr. Fisher, but the latter believes it impossible to secure the necessary constitutional amendment in less than five years.

These various items have been taken to Springfield to be introduced before the General Assembly, with the understanding that they may be revised by the City Council when it acts upon them, but they are placed before the Assembly at once in the hope that they may be passed and be ready for referendum vote in April or June.

I. T. S. Makes St. Louis Freight Connection

After the city of St. Louis had refused permission to the Illinois Traction Company to make a freight connection at Hall Street with the tracks of the Terminal Railroad Association the company made the connection at night over private property, with the consent of the Missouri Public Service Commission.

The company now is in direct connection with every steam railroad and industrial plant switch in St. Louis for coal deliveries. It has had on file for years a coal tariff of 10 cents a ton from the Tri-cities in Illinois to any point on its lines in St. Louis, although it has been unable before to reach any steam railroad and only hauled coal to the end of its bridge, where it was dumped into bunkers for dealers to cart away. The company operates over the streets of Venice, Ill., which is opposite St. Louis, on the surface. It is stated unofficially now that the company plans to construct, an extended bridge approach crossing Venice, Ill., to facilitate the expected heavy coal traffic.

Ira L. Burlingame, general traffic manager of the Terminal Association, has admitted that the connection between the Illinois Traction System and tracks of the Terminal Railroad Association had been built without the knowledge or consent of the Terminal Association officials. He said no coal cars had yet been tendered to the terminal and until such tender was made, he could not say what the policy of the Terminal Association would be.

The freight connection was made without crossing a city street, as formerly had been planned. A sharp turn was made on the Illinois Traction Company's own property, and its tracks tied to the Terminal without touching city ground.

Another Atlanta Dynamiting

Shortly after midnight on Feb. 5, after more than two months and a half of surcease from this type of violence, a car of the Georgia Railway & Power Company, Atlanta, Ga., was dynamited by strike sympathizers. The dynamite was laid on the company's rails in front of the English Avenue public school. A number of windows were broken in the car, the floor was damaged, and one of the wheels was cracked. Two city policemen were riding on the car, not as guards but as casual passengers. No injuries were sustained by them or the members of the car crew.

The last preceding instance of dynamiting in connection with the so-called strike against the Georgia Railway & Power Company, in the name of the Amalgamated Association, occurred on the night of Nov. 15, 1916, after a season of dynamiting that had begun on Oct. 5 and in the course of which thirty-one cars of the company were subjected to this form of violence.

The English Avenue School was the scene of an ambuscade in that same season, a number of men hiding behind the bushes in the school yard and "shooting up" a passing car late one night, wounding a member of the car crew.

On the day preceding the dynamiting of Feb. 5, Edward McMorrow, organizer of the Amalgamated Association, returned to Atlanta after an absence of several weeks.

The transportation department of the Georgia Railway & Power Company has been fully manned since immediately after the first disloyal trainmen abandoned their cars at the beginning of the evening rush hour on Sept. 30, and joined the Amalgamated Association.

An extended account of Atlanta's reign of terror in connection with the strike agitation was published in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1916, page 1262.

Electrification Work at Salt Lake

Plans Announced in May, 1916, Delayed on Account of Rearranging Plan of Financing, but Work Will Continue

The Salt Lake, Garfield & Western Railway, which owns and operates a steam railroad running between Salt Lake City and Saltair, and operating under the jurisdiction of the Interstate Commerce Commission, has work under progress for the extension of its lines from Saltair to Garfield, the whole line to be electrified. This comprises 17 miles of present railway and with the extension will include 20 miles of main linetrack.

Announcements of this extension and electrification work were made in the ELECTRIC RAILWAY JOURNAL for May 13, 1916. Owing to rearrangements in the plan of financing, construction work was delayed but has recently been resumed. All rails, poles, and ties are on the ground. The copper trolley and equipment, however, are yet to be purchased. The type of equipment and nature of electrification has not as yet been determined, but it is understood that H. A. Strauss, consulting engineer, Harris Trust Building, Chicago, who has this matter in hand, is in Salt Lake City at present to study the requirements. The work is being financed by C. F. Childs & Company, Chicago and New York, by means of a $300,000 first mortgage bond issue.

This railway affords the only transportation to the lake and to Saltair, which is visited by several hundred thousand people annually. The extension to Garfield will furnish a high-speed frequent service for the residents of that city to Salt Lake City. The concentrating plants of the Utah Copper Company and the smelters of the American Smelting & Refining Company are located at Garfield and the famous "copper mountain" of the Utah Copper Company, is located directly behind the city in Bingham Canyon. Since the mountain is connected with Garfield by the private railroad of the copper company, it is anticipated that considerable passenger traffic may be expected from this territory over the electrified line into Salt Lake City. It is also anticipated that with the improved service, the Salt Lake, Garfield & Western Railway may secure the transportation of some of the output of the copper smelters. The company now hauls considerable freight, this business including at present the transportation of 6000 tons of salt a month.

$7,000,000 Canadian Project

Failure of property owners along the route of the proposed Toronto-Niagara Falls hydroelectric line to approve bond issues for its construction has prompted the Canadian Northern Railway to decide to start immediately on the construction of a double-track line between Toronto and the Canadian-Niagara frontier at Niagara Falls, Ont., a distance of about 84 miles. Included in the company's plans is provision for the construction of a bridge across the Niagara gorge near the Bridge Street terminal of the International Railway, at Niagara Falls, Ont. The Canadian Northern Railway will have direct connections with the Erie, the Lackawanna, the Pennsylvania and the Lehigh Valley Railroads. Construction work, which will probably start in April, will involve the expenditure of more than $7,000,000. The route passes through Hamilton and St. Catharines, Ont., and the heaviest grades will be less than one-half of 1 per cent. Bridges will be built at Oakville, Bronté, across the Désjardines canal and River Jordan. The Ontario-Lewiston Connecting Bridge has been incorporated to handle the details of the Niagara gorge structure. Sir William MacKenzie of the Canadian Northern Railway is discussing the possibility of operating electric locomotives over the route, especially in view of the new power canal project of the Ontario Hydroelectric Commission.

Another Hudson Tunnel Reported

It has been reported recently that the Public Service Corporation of New Jersey was planning to extend its electric railway service from New Jersey under the Hudson River to New York City. A statement made by the company in regard to the matter follows:

"The Public Service Corporation has only this to say upon the subject at this time: Its officers have for a long time had in mind a tunnel project. Within the year it has begun such investigations as are necessary. The investigations have not been completed. Until they are completed the subject cannot be discussed by the Public Service Corporation. When the investigations are finished, the company will be glad to make public its findings and its conclusions."

Partnership Suggested in Frisco

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., was quoted by the San Francisco *Journal of Commerce* on Jan. 31 in part as follows:

"The time is not ripe for naming a figure which shall become a basis of sale to the city. If this were a matter between two corporations negotiations might be quickly brought to a head. But the entire public has to be taken into consideration in this case. Education, explanation and discussion of the merits of the various propositions are a necessary precedent to action.

"A physical valuation of the properties is now being made by the Railroad Commission. That will be used if the sale proposition is considered. I do not doubt that any set of fair-minded and competent men can agree upon a right valuation. I contend that the operation of a successful municipal system of street railways makes a monopoly necessary. I cannot expect the city to sell to us. Therefore I offer to sell to the city.

"The proposed four-line system down Market Street is unreasonable. The ideal street railway system would be one built by private capital, operated by a private company, the city to have a voice in the management, extensions to be made under the guidance of or at the instance of the city government, the municipality to have a definite fixed share of the earnings of the roads, and a valuation to be placed in advance upon the entire property with the proviso that the city might at any time buy the system at the price fixed. In such a case the franchise would be indeterminate. Price would be set on each new extension before construction. The public would be amply protected. Under such an arrangement San Francisco would be well served with transportation facilities and there would be no duplication. I cannot get money for extensions under the present system."

Operating Allowance Increase Asked

Cleveland Railway Makes Plea for Increase Under Tayler Grant

At the regular meeting of the Council of Cleveland, Ohio, on Feb. 5, a letter was read which had been addressed to Fielder Sanders, street railway commissioner, by J. J. Stanley, president of the Cleveland Railway, in which Mr. Stanley asked that the operating expense allowance be increased from 13½ cents per car mile to 15 cents. The letter also asked authority to charge off deficits in the operating allowance and maintenance reserve account from the interest fund.

Mr. Stanley stated that the operating deficit on Jan. 1, 1917, was $195,075, and that the deficit in the maintenance reserve account was $268,918. These deficits are due to abnormal expenditures, payments for injuries and damages, increased wages and the high price of supplies. Practically the same causes contributed toward the higher operating allowance requested.

Expressions from Chairman Reynolds of the street railway committee and Councilmen Myers and Stolte indicate that they will oppose any movement to increase the operating allowance, but they did not give any plan by which the increasing expenses can be met by the company without this step. Mayor Harry L. Davis refused to comment upon the matter until he could confer with Mr. Sanders, who is ill.

An increase in the operating allowance would no doubt mean an advance in the rate of fare, especially if present deficits are deducted from the interest fund. Under the provisions of the Tayler franchise an increase in fare would follow the reduction of the interest fund to less than $300,000.

A resolution has been adopted by the Council authorizing the Cleveland Railway to expend $300,000 for a new substation.

$1,500,000 to Be Spent in Tacoma

Louis H. Bean, general manager of the Tacoma Railway & Power Company, Tacoma, Wash., is authority for the statement that approximately $1,500,000 will be spent during 1917 in Tacoma by that company and the Puget Sound Electric Railway, both of which are controlled by the Puget Sound Traction, Light & Power Company. A considerable amount of the funds appropriated will go into new equipment and for bettering the service. The company plans to spend $70,000 for new cars, and will install heaters in twenty-one cars not having them at present.

Passaic Gas Case Closed

The Public Service Gas Company, controlled by the Public Service Corporation of New Jersey, has decided to make no further effort to restore the rate of $1 per thousand cubic feet for gas and, after a formal motion before the United States Supreme Court, the appeal which had been made to that court was dismissed. An agreement to this effect was reached by counsel representing the gas company, the New Jersey Board of Public Utility Commissioners and the cities of Passaic and Paterson, all of which were parties to the litigation. In explanation of this action President Thomas N. McCarter of the company stated substantially as follows:

When the order of the Board of Public Utility Commissioners, effective Feb. 1, 1913, was made, fixing the price of gas at 90 cents per thousand cubic feet, the ruling was very burdensome; in fact, it was considered confiscatory of the company's property. The litigation in regard to the order, due to no fault of the company, has been very protracted, four years having elapsed since the order was made. Latterly due to the growth of the business and certain other features connected therewith the burdensome features of the rate have been lessened. The company decided that even if it won the case it would not go back to the dollar rate. Under these conditions it was not proper to present the case to the court as the only effect of a favorable decision would be to obtain an opinion of the court and not a judgment to be put into force.

Cleveland Paving Case Decided.—Common Pleas Court rendered a decision on Jan. 22 to the effect that the Cleveland Railway must pave the space occupied by its tracks on Euclid Avenue through East Cleveland and that the work must be begun by June 1. The city and county laid their portions of the pavement last fall, but the remainder is in the condition left at that time. The company claims that East Cleveland enjoys the same rate of fare as is paid in Cleveland and that it should not expect it to build pavement, when the Cleveland franchise does not demand it. However, the East Cleveland franchise does contain this stipulation.

Publication of Toledo Plan Postponed.—On request of Henry L. Doherty, of Henry L. Doherty & Company, who operate the Toledo Railways & Light Company, the Street Railway Commission of Toledo, Ohio, has decided to delay publishing the proposal prepared as a solution of the franchise question until Mr. Doherty has filed suggested changes in certain portions. He wired the commission that the company could not accept some portions of the plan as they stand, and would prefer that no publication be made until he could suggest changes. These he will submit in the shape of redrafts. Mr. Doherty has been unable, because of illness, to be in Toledo for some time.

Commission Seeks to Compel Compliance With Its Order.—Assistant District Attorney Unger, acting on a complaint filed by the Public Service Commission, has started a proceeding before Justice Freschi of Special Sessions, sitting as a Magistrate, to punish the officials of the Third Avenue Railway, the Belt Line Corporation, and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y., for failure to comply with an order issued by the commission last April. The three companies were represented by Joseph H. Choate, Jr., who said his clients had endeavored to comply with the requirements of the order, but were prevented by the torn-up conditions of one of the streets. The court ordered both sides to submit briefs.

Abandonment of Gettysburg Line Proposed.—What is believed to be the first step in the abandonment of the electric railway on the Gettysburg Battlefield at Gettysburg, Pa., has been taken in the introduction of a bill in Congress authorizing the purchase of the right-of-way in the National Military Park and carrying an appropriation of $30,000 for the purpose. It is understood that the bill has the approval of the National Park Commission, which never has regarded the presence of the electric railway on the field with special favor. The cars have been run in a more or less desultory fashion for twenty-three years. For the last two years only one car has been used to cover the route. Except in years of National Guard encampments or big reunions, the line has never been operated at a profit.

Abandonment of State Railway Urged.—The State of North Dakota will abandon the street railway business, will surrender the charter under which it operates in Bismarck and will dispose of the present so-called Capital Car Line for the purpose of repaying to the Capitol building fund, moneys expended in the construction of the line, if the Legislature acts in accordance with an opinion filed by Attorney-General William Langer with the State Budget Commission. The opinion, prepared by Assistant Attorney General Dan V. Brennan, holds that the State of North Dakota is engaged in the street railroad business in contravention of the provision of the constitution. The Capital Car Line is 1.5 miles long. It was built to afford a permanent means of conveyance between the Capitol grounds and the railroad station. One car is operated.

Market Street Line, San Francisco, Authorized. — After the Board of Supervisors of San Francisco, Cal., had passed for print on Jan. 28 a resolution which authorized the immediate construction on Market Street of the Twin Peaks tunnel line by the city James E. Powers offered a resolution providing for the purchase of all the holdings of the United Railroads of San Francisco by the city as the "best solution of transportation problems." The resolution was not discussed. At the meeting of the supervisors at which this resolution was presented a letter was read from Jesse W. Lilienthal, president of the United Railroads, in which he asked the supervisors to delay action on the additional line until the city engineer and the general manager of the United Railroads had an opportunity "to confer with a view to devising some plan that will provide for a fair solution of pending transportation problems."

Pacific Electric Club Opens Headquarters.—The Pacific Electric Club, composed of employees of the Pacific Electric Railway, Los Angeles, Cal., opened new quarters in Los Angeles last month, with a three-day celebration. The new club headquarters are at 431 South Hill Street, adjoining the Hill Street station, and occupy two entire floors of the building. The company provided $25,000 with which to fit up the quarters, which include all conveniences of modern club rooms. Arrangements have been made so that wives of employees may use the club rooms, and facilitate shopping excursions by having parcels delivered to the club. There are pool and billiard rooms, a library, a kitchen, lounging rooms and large halls specially arranged for dancing. F. L. Annable, general superintendent of the railway, is president of the club, and Ed. Thomas, manager of the traffic department of the company, is the secretary.

Mr. Dempsey Convicted of Violating Commission Order.—John J. Dempsey, superintendent of elevated transportation of the Brooklyn (N. Y.) Rapid Transit Company, was found guilty, on Feb. 6, by a jury before Judge Roy in the Kings County Court on charges of violating an order of the Public Service Commission issued in 1912. Mr. Dempsey's is the first conviction under the law which makes a violation of a Public Service Commission order a misdemeanor. The maximum penalty is a year in prison or a fine of $500 or both. Mr. Dempsey's indictment followed the failure of elevated express trains of the Brooklyn Rapid Transit Company to make the Third Street station stop on the Fifth Avenue line. The Public Service Commission, after a hearing, ordered the stop made, but the company argued it was unable to do so because of another Public Service Commission order which limited the running time of trains to Manhattan. Mr. Dempsey will be sentenced on Feb. 12. His $1,000 bail was continued.

Partnership Agreement Suggested in Kenosha.—S. B. Way, vice-president of the Wisconsin Gas & Electric Company, which operates the street railway lines in Kenosha, Wis., has proposed to Mayor Pfennig that the city share equally in the profits of the company above 6 per cent. The company in return asks the co-operation of the city in making the company a paying concern. Mr. Way declared that the line had been operated at a loss for the last three years. According to the plan as outlined by Mr. Way, the company will be permitted to pay overhead and operating expenses and an annual dividend of 6 per cent to its stockholders. All profits above this amount, minus 20 per cent to be given as bonuses for employees of the company actually operating the lines, will be divided equally between the city and the company. The only demand made upon the city is that it co-operate with the company to secure the most profitable possible operation of the lines. The company has placed the physical valuation of the lines, the basis for profit, at $375,000. This is less than the company paid for the property when it was purchased four years ago.

Cincinnati Loop Arrangement Protested.—W. L. Woodward, chairman of the transportation committee of the Federated Improvement Associations, of Cincinnati, Ohio, recently sent a letter to the Rapid Transit Commission, calling attention to the failure of the commission to include in the proposed lease to the Cincinnati Traction Company any agreement for a 5-cent fare on all interurban cars within the city limits, a restricted transfer system on the Millcreek Valley route and omission of a fixed charge for interest and sinking fund charges on the rapid transit bonds. Mr. Woodward claims that, as it stands, the lease makes the Cincinnati Traction Company a preferred creditor against the city and insures it against loss. He also objected to a fixed annual franchise tax of $325,000 for the company, in place of the present 6 per cent basis, on the ground that all the money is used for repair of streets over which the company's tracks run and that the amount should increase in the same propertion as the company's gross receipts. In reply to an inquiry, Mr. Woodward said his letter was not approved by the transportation committee, but that it embodied the sentiments of members expressed at a recent meeting. It was referred without comment to the conference committee of the City Council.

Financial and Corporate

New York Franchise Taxes Raised

State Board Reports Increases of $34,362,900 in New York City

The State Tax Commission of New York made public on Jan. 29 the special franchise valuations for 1917 for New York City. In a note of explanation the commission says:

"In the systems embracing operated and affiliated companies taken as a whole, with the exception of the Third Avenue Railway, there have been substantial increases, although some of the individual companies within the systems have been reduced."

The total of special franchise tax valuations for New York City, the State Commission says, is $494,231,250. This is an increase of $34,362,900 over the preceding year. Detailed valuations of the principal electric railway properties follow:

	1917	Increase
Brooklyn Rapid Transit system	$46,396,000	$3,352,100
New York Railways system	28,000,000	*1,439,000
Third Avenue Railway system, total	20,096,000	*5,344,000
Manhattan Railway—		
Bronx Borough	6,450,000	*2,808,000
Manhattan Borough	63,400,000	3,323,000
Richmond Light & Railroad Co.	1,600,000	600,000
Hudson & Manhattan Railroad	8,234,000	.....
Pennsylvania Tunnel & Terminal Co.	17,478,800	412,200

*Indicates decreases.

1916 Financing in Great Britain

Government Borrowings Overshadow All Else—No New Tramway and Omnibus Capital Raised

In its annual summary of British new financing, the London *Economist* shows that the control exercised by the treasury committee over new issues had even a stronger effect in 1916 than in the year preceding, for apart from British Government borrowing and subscriptions in London to the second French loan, only about £16,000,000 out of £585,436,400 was raised. Of this about £6,500,000 was raised by the colonial governments, so that the utility, industrial and other companies secured less than £10,000,000 during the year.

The following analysis shows the various purposes to which the new capital created was devoted:

Description	1916	1915
British Government	£554,071,100	£614,250,700
Colonial Government	6,500,000	17,385,000
Foreign Governments	15,000,000	38,450,000
British municipalities	495,000	.....
Colonial corporations	.....	350,000
Foreign corporations	.....	.....
British railways	1,679,000	3,294,000
Indian and colonial rails	.....	3,965,000
American railways	.....	.....
Foreign railways	384,000	2,940,000
Mining companies:		
Australian	7,500	.....
South African	.....	.....
Other mines	15,000	21,500
Exploration and financial	.....	45,000
Breweries and distilleries	.....	.....
Merchants, etc.	102,500	.....
Manufacturing	1,449,300	1,807,500
Stores and trading	.....	.....
Estate and land	.....	25,000
Rubber	15,600	152,700
Oil	1,573,500	22,100
Iron, coal, steel, etc.	1,275,000	162,900
Electric lighting, power, telegraph, etc.	102,400	546,900
Tramways and omnibus	.....	432,500
Motors	381,300	130,000
Gas and water	16,400	20,000
Hotels and theaters, etc.	7,000	78,700
Patents	27,000	.....
Docks and shipping	800,000	580,000
Banks and insurance	275,000	266,200
Miscellaneous	1,259,800	316,000
	£585,436,400	£685,241,700

From the foregoing figures it appears that new capital issues for tramways and omnibus lines decreased from £432,500 in 1915 to nil in 1916, while the new issues for electric lighting, power, telegraph, etc., companies dropped from £546,900 to £102,400. Big increases, however, were apparent for oil companies, iron, coal and steel companies, and miscellaneous organizations.

Annual Report

Lehigh Valley Transit Company

The comparative income statement of the Lehigh Valley Transit Company, Allentown, Pa., for the years ended Nov. 30, 1915 and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Passenger revenue	$1,852,506	74.9	$1,550,125	75.4
Other transportation revenue	115,002	4.7	99,297	4.8
Revenue from other railway operations	504,363	20.4	407,453	19.8
Total operating revenue	$2,471,871	100.0	$2,056,875	100.0
Operating expenses	1,433,665	58.0	1,130,835	55.0
	$1,038,206	42.0	$926,040	45.0
Taxes	84,445	3.4	73,552	3.6
Operating income	$953,761	38.6	$852,488	41.4
Non-operating income	145,209	5.8	136,146	6.6
Gross income	$1,098,970	44.4	$988,634	48.0
Deductions from gross income	630,493	25.5	665,246	32.3
Net income	$468,477	18.9	$323,388	15.7

In view of the unprecedented economic conditions, which greatly increased all labor and material costs entering into maintenance and operation, the foregoing showing for the last year was considered most satisfactory. Revenue from transportation increased $318,086 or 19.2 per cent, power sales advanced $96,473 or 24.2 per cent, and total operating revenue increased $414,996 or 20.1 per cent. Operating expenses, however, rose $302,830 or 26.8 per cent, and taxes $10,893 or 14.8 per cent. Yet the final result was an increase of $145,089 or 44.8 per cent in net income.

Dividends of $248,983, equivalent to 5 per cent on the preferred stock outstanding, were disbursed. The last fiscal year was the first time that the company paid the full 5 per cent dividend on its preferred stock. At the same time it was able to add to its surplus account, which now stands at $560,200, an increase of 62.7 per cent.

Beginning with the fiscal year 1911 there has been credited each year to maintenance, renewals and depreciation an amount equal to 22 per cent of the gross earnings of the railway lines. All items of maintenance and renewals are charged to this account, the balance being set up to accrued depreciation reserve. This showed a credit of $293,241 as of Nov. 30, 1916.

The operation of jitneys in the company's territory declined remarkably during the year, it is said, and could not be considered as a competitive factor. A fast and reliable freight service is operated by the company connecting with the Philadelphia Rapid Transit Company at Chestnut Hill, Philadelphia. The surplus from the freight business in the last year increased $2,905 or 18.9 per cent. The operation of the Adams Express Company over the company's lines resulted in an increase of $1,288 in the surplus from its business or 13.9 per cent.

Returns for Montana Lines

The latest report of the Montana Board of Railroad Commissioners, which is *ex-officio* the Public Service Commission of the State, contains tables showing the investment in plant and equipment, operating revenues and operating expenses of Montana street railways for the year ended June 30, 1916. These tables are partly reproduced herewith. It should be noticed that for combined lighting and railway properties only transportation data are included.

STATISTICS FOR MONTANA ELECTRIC RAILWAYS FOR YEAR ENDED JUNE 30, 1916

	Plant and Equipment	Operating Revenue	Operating Expenses†	Per Cent Operating Net to Investment
Anaconda C. M. Co.	$313,727	$132,334	$98,369	10.82
Billings Traction Co.	120,955	23,761	28,917	0.00
Butte Electric St. Ry.	2,514,664	550,037	502,639	1.88
Montana Power Co.	*.....	137,474	76,853	*...
Helena L. & Ry Co.	*.....	85,874	82,984	*...
Missoula St. Ry.	666,990	73,002	74,177	0.00

*Railway figures not separately reported.
†Includes taxes and depreciation.

Terms of Texas Merger

Capitalization of Texas Electric Railway, a Consolidation of the Texas Traction Company and the Southern Traction Company, Totals $19,660,000

With practically all stock represented, either in person or by proxy, stockholders of the Texas Traction Company and the Southern Traction Company, at a meeting in Dallas, Tex., on Jan. 30, voted unanimously to approve the terms of consolidation of the two companies into the Texas Electric Railway. As noted in the ELECTRIC RAILWAY JOURNAL of Feb. 3, page 225, of the 30,000 shares of stock of the Texas Traction Company outstanding, 26,820 shares were represented at the meeting, and of the 70,000 shares of Southern Traction Company stock outstanding, 67,298 shares were represented.

J. F. Strickland, president of the two companies, was elected president of the newly formed company. Other officers of the Texas Electric Railway were elected as follows: Vice-presidents, Osce Goodwin, Dallas; R. B. Stichter, Dallas; C. W. Hobson, Dallas; J. L. Penn, Waxahachie; F. N. Drane, Corsicana; W. J. Neale, Waco; W. R. Brents, Sherman; J. S. Heard, Dallas; H. I. Gahagan, Dallas; and Burr Martin, Dallas; secretary and assistant treasurer, James P. Griffin, Dallas; assistant secretaries, J. C. Thompson, Corsicana; C. L. Cox, Dallas, and W. H. Painter, Dallas; treasurer, H. I. Gahagan, Dallas; general manager, Burr Martin, Dallas.

The directors of the company are J. F. Strickland, Osce Goodwin, George W. Bowman, W. R. Brents, J. L. Lovejoy, S. D. Moore, W. B. Munson, R. B. Stichter, R. L. Waddell, A. A. Jackson, C. B. Dorchester, W. W. Batcheler, F. N. Drane, W. D. Lacy, W. J. Neale, W. W. Seley, J. L. Penn, J. H. Miller, A. L. Smith, George W. Coleman and M. B. Templeton. The members of the executive committee are J. F. Strickland, Osce Goodwin, T. J. Cole, R. E. L. Saner, John N. Simpson, J. S. Heard and C. W. Hobson.

The total of authorized capitalization of the Texas Electric Railway is $19,660,000, as follows: first preferred stock, $1,500,000; second preferred stock, $3,000,000; common stock, $6,000,000; twenty-five-year 6 per cent convertible debentures, $2,160,000; first and refunding 5 per cent bonds, $4,804,000; divisional underlying bonds, $2,196,000.

TERMS OF MERGER

The terms of the merger approved by the stockholders include the following:

1. Of the $1,500,000 of first preferred stock of the Texas Electric Railway $700,000 will be used to purchase, acquire or discharge obligations of the Texas Traction Company and the Southern Traction Company, and the remaining $800,000 will be held in the treasury to provide for future betterments, improvements and extensions.

2. Of the $3,000,000 of second preferred stock of the company $1,200,000 will be delivered to the Texas Traction Company and $1,800,000 to the Southern Traction Company, for distribution among their preferred stockholders at the following ratios: $120 par value of second preferred stock of the Texas Electric Railway for each $100 par value of the preferred stock of the Texas Traction Company, and $107.20 par value of second preferred stock of the Texas Electric Railway for each $100 par value of preferred stock of the Southern Traction Company.

3. Of the $6,000,000 of common stock of the company $2,000,000 will be delivered to the Texas Traction Company and $4,000,000 to the Southern Traction Company for distribution among their stockholders in the following ratios: $100 par value of common stock of the Texas Electric Railway for each $100 par value of common stock of Texas Traction Company, and $80 par value of common stock of Texas Electric Railway for each $100 par value of common stock of the Southern Traction Company.

The Texas Electric Railway also authorized an issue of first and refunding mortgage 5 per cent gold bonds to the amount of $4,804,000, and twenty-five-year 6 per cent convertible debentures to the amount of $2,160,000, subject to present outstanding divisional and underlying bonds to the amount of $2,196,000. The proceeds of the first and refunding bonds and the debentures will be used in refunding or discharging present outstanding bonds of the Southern Traction Company and also in refunding or discharging present outstanding gold notes of the Texas Traction Company to the amount of $700,000.

EXTENT OF SYSTEM

The Texas Electric Railway extends north from Dallas through McKinney and Sherman to Denison; from Dallas southeast to Corsicana and from Dallas south through Waxahachie to Waco. The company also does the entire street railway business in Waco, Denison, Sherman, Corsicana, Waxahachie and McKinney. The company operates a total of 259 miles of main track, of which it owns 249 miles. The total mileage, including second track, yard track, etc., owned by the company is more than 267 miles. Power is purchased from the Texas Power & Light Company under long-time contracts.

Merger Proposed in Reading

Reading Transit & Light Company and Metropolitan Electric Company Propose to Take Over Leased Properties

Announcement was made in Reading on Feb. 5 by officials of the Reading Transit & Light Company that an application will be made to the Public Service Commission of Pennsylvania on Feb. 20 for approval of the proposed purchase of the controlling interest in the United Traction Company. The Metropolitan Electric Company has made similar application for the approval of the purchase of the Edison Electric Illuminating Company and the Lebanon Valley Electric Light Company, both of Lebanon, Pa. The Reading Transit & Light Company on Feb. 5 authorized the following statement:

"This is the first step in a plan which will establish the financial strength of our companies on such a basis as to make possible the development and extension of the railway and electric service in Reading and vicinity in a manner and on a scale in keeping with the progressiveness of this district.

"The properties we operate are leased by us for long terms. The acquisition of these properties would avoid the payment of rentals. The leases of the various properties contain options giving us the right to buy, but these leases do not expire for many years. At the present time we have no idea when and how these options might be exercised, and the steps taken at this time are only preliminary to the possible development of a plan along these lines. The exercising of the options would, of course, depend upon whether the Public Service Commission feels, as we do, that it would be to the best interests of the people of Reading and vicinity in general to have us do so.

OUTLINE OF PLAN

"The plan is to have the Metropolitan Electric Company acquire a controlling interest in the Edison Electric Illuminating Company, the Pennsylvania Utilities Company and the Lebanon Valley Electric Light Company. This does not mean a change in the ownership of these companies. At the present time they are controlled by the same financial interests as the Metropolitan Electric Company, and the transferring of the control of these companies to the Metropolitan would result in economies in the operation and management of all of the properties, as the Reading organization, with very little expense, can be expanded to take care of these properties. All of the electric properties in and about Lebanon are at the present time connected with the large generating station of the Metropolitan Electric Company at West Reading by transmission line.

"Whe West Reading plant is susceptible of development on an unlimited scale and will continue to be the logical center of a large power supply. The capacity of the West Reading plant has been greatly augmented during the past year by improvements and additions which have doubled the capacity of the plant, and contracts have recently been let for still further improvements and additions which will again double the present capacity of the plant by the year 1918."

New Holding Company Planned

National Utilities Company Will Take Over the National Properties Company, National Gas, Electric Light & Power Company and the Jersey Central Traction Company

The National Utilities Company has been incorporated under the laws of Delaware to bring under one management the National Properties Company, the National Gas, Electric Light & Power Company, and the Jersey Central Traction Company. The National Utilities Company will have authorized stock issues of $10,000,000 each of common and preferred stocks and will market $2,500,000 of three-year 6 per cent notes. For the present only $4,000,000 of common and $3,000,000 of preferred stock will be issued. The consolidation is being effected by the banking firms of Bioren & Company and Newburger, Henderson & Loeb. The firm of Hecker & Company is interested in the National Gas, Electric Light & Power Company, which is to form an important part of the proposed merger.

Owners of the preferred stock of the National Gas, Electric Light & Power Company may exchange their holdings on the basis of 90 per cent in new 6 per cent collateral trust bonds of that company and 10 per cent in preferred stock of the new holding company. Holders of the common stock will receive $47.64 in cash, $30 in 6 per cent notes of the holding company and $20 in common stock for each share of their present common stock holdings. It is not stated what holders of National Properties Company stock or those of Jersey Central Traction Company will receive. Holders of shares of the National Gas, Electric Light & Power Company must deposit their stocks with the bankers interested on or before Feb. 15 in order to take advantage of the offer. The proposed arrangement is contingent upon a sufficient number of both classes of shares being deposited.

Van Horn Ely, president of the National Properties Company and its subsidiary, the American Railways, will continue in active charge of the various properties and companies.

The companies included in the merger operate 623 miles of street railways and supply electric light and power to more than fifty cities and towns and gas to eleven cities. Their combined gross earnings for the year 1916 amounted to $9,327,702.

Cleveland Fare Increase Inevitable

At the annual meeting of the Cleveland (Ohio) Railway on Jan. 31, President J. J. Stanley told the board of directors that an increase in the rate of fare is inevitable. Mayor Harry L. Davis had previously suggested through the newspapers that an election be held in 1918 to vote on a bond issue for the purpose of taking over the property. This, in effect, was President Stanley's reply. Mayor Davis had publicly avowed that the service must be improved or the city would take over the property, and he was answered by Mr. Stanley in a published statement that the city could buy the stock of the company at $110 whenever it liked, under the terms of the Tayler franchise.

President Stanley stated at the board meeting that he will ask Council for an increased operating allowance, as the advance in the cost of materials and labor has made this necessary. Should Council refuse, the question, under the franchise, may be taken before a board of arbitration.

In regard to the statement of President Stanley, Commissioner Sanders said it is obvious that an increase in fare must come in time, as materials are costing 40 per cent more than formerly, but the practice of strict economy, he believes, will postpone the necessity for making an increase for a year at least. He said he would be opposed to making an increase at this time.

The annual report submitted at the meeting showed gross receipts of $9,597,306; expenses, $7,044,432; taxes, $579,423; interest, $1,912,815; surplus, $60,635. The increase in the gross receipts amounted to $1,054,993. The total number of passengers carried was 375,382,748, an increase of 12 per cent over 1915. The big day was Dec. 23, when 1,351,985 passengers were carried.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—Plans are being made to incorporate a new street railway to acquire the franchise of the Dunkirk (N. Y.) Street Railway, now held by the Buffalo & Lake Erie Traction Company. The Dunkirk Street Railway operates a belt line service around the city, but for some time past efforts have been made by the Buffalo & Lake Erie Traction Company to abandon this route, which it contended was unprofitable. Several conferences have been held by the City Council of Dunkirk and representatives of central New York interests who are fostering the project. The Council appears to be willing to grant a new franchise to the new company provided a fifteen-minute service is maintained. This is said to be agreeable to the representatives of the proposed company.

Detroit (Mich.) United Railway.—At the annual meeting of Detroit United Railway on Feb. 6, all retiring directors and officers were elected. The stockholders approved an increase in the capital stock of the company from $12,500,000 to $25,000,000, and the board took action offering $2,500,000 of the new stock to stockholders of record of Feb. 16 at par in the proportion of one share of the new stock for each five now held. Subscription rights will expire on March 29.

Lehigh Valley Transit Company, Allentown, Pa.—Negotiations are reported to be under way for consolidating the Lehigh Navigation Electric Company, owned and controlled by the Lehigh Coal & Navigation Company, and the Lehigh Valley Transit Company. The deal has for its object the combining of all the power plants of these two companies into one central power system, increasing the power plant of the Lehigh Navigation Electric Company at Hauto and enlarging the Allentown plant of the Lehigh Valley Light & Power Company, which is controlled by the Lehigh Valley Transit Company.

Los Angeles (Cal.) Railway Corporation.—The City Railway, Los Angeles, has filed with the California Railroad Commission an application for authority to issue $303,000 par value of bonds and to deliver the same to the Los Angeles Railway Corporation in payment of moneys advanced and invested in the plant of the City Railway. The company says that it had an investment of $3,893,000 in its system before making the additional investment of $303,433, and that in accordance with the provisions of its trust deed it wishes now to sell these additional bonds, the money for which was obtained from the Los Angeles Railway Corporation.

Shore Line Electric Railway, Norwich, Conn.—A lengthy bill amending the charter of the Shore Line Electric Railway has been introduced in the Legislature of Connecticut. The bill provides for the dissolution of the Norwich & Westerly, the Groton & Stonington and the New London & East Lyme Street Railways and joins them under the title of the Shore Line Electric Railway. Provision is also made for the operation of street railways by the company in Rhode Island. It is also provided that the Shore Line Electric Railway shall have power to sell energy for commercial purposes. The bill further provides for the increase of the company's capital stock to an amount not exceeding $8,000,000. The company has outstanding at present $300,000 of preferred stock and $700,000 of common stock. It operates under lease the New London division of the Connecticut Company, controlled by the New York, New Haven & Hartford Railroad, which under the requirement of the United States Department of Justice is obligated to dispose of its electric railway holdings in both Connecticut and Rhode Island within a period of five years from Nov. 7, 1914.

St. John (N. B.) Railway.—The St. John Railway, controlling tramways, electric light, power and gas in St. John, has called a special meeting of stockholders to consider an offer to purchase the entire assets of the company. The New Brunswick Investment Company, Ltd., formed for the purpose, has offered $1,300,000 for all the company's properties and franchises and in addition $10 a share for each share transferred, making a total of $140 per share net to the shareholders. The circular says: "The directors are of the opinion that the offer should be accepted."

United Service Company, Scranton, Pa.—The DuBois (Pa.) Traction Company has been taken over by the Keystone Utilities Company, a holding company which has recently been formed to acquire various public utilities. The United Service Company has an operating agreement with the Keystone Utilities Company to operate the DuBois property, and for this reason the management of the DuBois company will be charged to the United Service Company. The local manager, R. B. Blakeslee, will continue as resident manager in DuBois.

Dividends Declared

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Bristol & Plainville Tramway, Bristol, Conn., quarterly, 2 per cent.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Pacific Gas & Electric Company, Sacramento, Cal., quarterly, 1½ per cent, original preferred; quarterly, 1½ per cent, first preferred.

Electric Railway Monthly Earnings

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec.,		'16	$176,571	*$123,253	$53,318	$35,856	$17,462
1 "	"	'15	154,561	*104,075	50,486	36,478	14,008
12 "	"	'16	2,056,362	*1,380,868	675,494	433,911	241,583
12 "	"	'15	1,909,544	*1,302,702	606,842	436,166	170,676

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., Dec.,		'16	$87,477	*$57,445	$30,032	$27,550	‡$2,618
1 "	"	'15	73,105	*78,317	†5,212	22,358	‡†27,358
6 "	"	'16	541,664	*426,471	115,193	166,006	‡†49,724
6 "	"	'15	498,746	*400,203	98,543	106,885	‡†7,299

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Dec.,		'16	$336,954	*$200,513	$136,441	$43,565	$92,876
1 "	"	'15	300,315	*164,527	135,788	41,189	94,599
12 "	"	'16	3,537,399	*2,105,124	1,432,275	516,373	915,902
12 "	"	'15	3,113,175	*1,846,437	1,266,738	476,281	790,457

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., Dec.,		'16	$808,198	*$682,285	$125,913	$103,218	‡$45,262
1 "	"	'15	704,552	*477,524	227,028	99,722	‡150,413
6 "	"	'16	5,070,883	*3,897,273	1,173,610	591,109	‡748,405
6 "	"	'15	4,452,422	*2,974,355	1,478,067	592,736	‡1,024,591

LEWISTON, AUGUSTA, & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Dec.,		'16	$63,270	*$50,711	$12,559	$15,401	†$2,842
1 "	"	'15	57,929	*40,889	17,040	15,942	1,098
12 "	"	'16	803,660	*553,296	250,364	187,773	62,591
12 "	"	'15	737,850	*475,422	262,428	189,839	72,589

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Dec.,		'16	$216,914	*$124,162	$92,752	$42,128	$50,624
1 "	"	'15	204,364	*116,881	87,483	42,946	44,537
12 "	"	'16	2,383,041	*1,453,188	929,853	508,971	420,882
12 "	"	'15	2,143,903	*1,318,334	825,069	510,587	314,482

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., Dec.,		'16	$49,155	*$55,436	†$6,281	§$9,935	‡†$14,900
1 "	"	'15	42,794	*46,228	†3,433	§5,540	‡†7,641
6 "	"	'16	308,464	*287,024	21,440	§41,702	‡†14,152
6 "	"	'15	257,135	*254,386	2,749	§36,000	‡†23,681

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Dec.,		'16	$512,594	*$257,702	$254,892	$183,084	$71,808
1 "	"	'15	482,938	*255,280	227,658	182,824	44,834
12 "	"	'16	5,483,110	*3,038,254	2,444,856	2,178,258	266,598
12 "	"	'15	5,511,345	*3,073,628	2,437,717	2,208,356	229,361

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., Dec.,		'16	$481,638	*$389,007	$92,631	$119,634	‡†$26,107
1 "	"	'15	440,663	*350,340	90,323	120,150	‡†28,149
6 "	"	'16	3,083,384	*2,204,373	879,011	721,628	‡191,520
6 "	"	'15	2,756,262	*2,047,156	709,106	722,286	‡21,776

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee, also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to income of that company.

Traffic and Transportation

Los Angeles Fare Case Dismissed

California Commission Decides in Favor of Company —Extension of City Boundary Does Not Work Automatically to Decrease Fares

The Railroad Commission of California has dismissed the applications of Palms, Richardson, Bairdstown, and certain sections of Hollywood, to reduce fares on the Pacific Electric Railway, Los Angeles, to a 5-cent basis. The commission says that if the desired reduction were made, the Pacific Electric Railway would further lose $300,000 a year, and that such a condition would be created as to make operation of the road much more burdensome. The Southern Pacific Railroad owns all of the Pacific Electric Railway stock and a great amount of its bonds. The commission says that only because of this ownership has the Pacific Electric Railway been able to support the losses caused by jitney competition. The jitney losses and the $821,734 of the actual loss sustained in 1916 would create an annual deficit in excess of $1,000,000. The commission believes that the situation would have been worse had not the freight earnings of the Pacific Electric Railway increased $500,000 in 1916 over 1912. The commission found that the income of the Pacific Electric Railway has been decreased between $30,000 and $40,000 a month as a result of jitney competition. On this point the opinion of the commission says:

"It must be obvious that the company cannot, when showing such great deficit, be expected to give improvements in service which might otherwise be properly required or reduce fares still lower, thereby increasing its already severe losses. The evidence shows that the present fares do not give the Pacific Electric Railway sufficient revenue to meet its current expenses."

The Commission's Opinion

In rendering its decision the commission said in part:

"The population of Los Angeles for 1910 was 319,198; in 1912, estimated on basis of registration, it was 461,558, and on the same basis for 1915 it was 558,011, but notwithstanding this great increase in population, defendant's passenger revenue shows practically no improvement, being $6,677,289 in 1912, as compared with $6,705,708 in 1916, a difference of only $28,419.

"For the transportation of milk the revenue in 1912 was $41,569, in 1916 it was $4,939, a net loss of $36,629. The total of all traffic handled by passenger trains in 1912 was $6,882,654, and in 1916 only $6,880,742, or a net reduction at the end of the five-year period of $1,911. The freight earnings, however, increased from $1,112,683 in 1912 to $1,656,067 in 1916, or $543,384. During the same period taxes increased from $320,698 in 1912 to $515,556 in 1916, an excess of $194,857. Interest on funded debt increased from $2,081,607 in 1912 to $2,834,107 in 1916. New bonds amounting to $15,066,000 were issued in conformity with this commission's decisions, these including bonds for refunding, as well as for improvements, additions and betterments. It is also to be noted that the interest on unfunded debt increased from $114,337 in 1912 to $254,192 in 1916.

"The defendant has never paid a dividend and shows, as of June 30, 1916, a deficit of $4,432,855. In the year 1912 there was a net income profit of $496,216; in 1913, a profit of $199,871; in 1914, a loss of $467,220; in 1916, a loss of $683,521, and in 1916 a loss of $821,734.

"While it would be advantageous to certain residents and property owners of the districts affected by these proceedings to secure reductions in the present fares, the public in general, as well as the carrier, have an interest in the margin of safety due to a public utility and, therefore, this commission must and will take into consideration not only these complainants, but the rights of defendant and all other interests served by this defendant, whose legitimate investments should not be injured.

"The mere fact that territory is annexed to a city does not automatically operate to reduce existing fares which are higher than 5 cents to 5 cents, if the higher fares are justifiable. This rule has been previously declared by this commission in Froelich vs. Los Angeles Railway Corporation.

"Complainants have not proved the rates to be discriminatory; neither has it been shown that the districts in question furnish a traffic of sufficient volume to justify a street car fare of 5 cents, and the commission finds that the charges and fares to the points and places designated in the complaints herein, which were lawfully in effect on Nov. 3, 1914, are justified.

"This commission can only prescribe just and reasonable rates and, after careful deliberation upon all the elements in these cases and the effect upon the revenue which would result from the reductions demanded by complainants, I am of the opinion that the facts do not sustain the complaints and recommend that the cases be dismissed."

Chicago Paper Studies Car Delays

The Chicago *Herald* has recently been making a survey of the causes for street car delays during rush hours in Chicago. Starting out with the announcement that it intended to investigate this subject, in view of the wide discussion about delayed traffic, the paper assigned reporters to ride on the cars on different routes and report on the nature and length of all delays. Then for several days it printed a column or more of specific information showing just what car operators have to meet in making their rush-hour runs.

In general, the evidence showed that the drivers of automobiles, trucks and other vehicles use the car tracks freely, either because of a willful or careless disregard for car operation or because of the parking of automobiles along the curb, so as to leave not much more than the tracks open. In practically all cases the delay could have been avoided if vehicular traffic had not been on the tracks. The survey may aid materially in the execution of recommendations made in the report of the Chicago Traction & Subway Commission for an ordinance prohibiting the unnecessary use of tracks by vehicles in rush hours.

In closing its campaign of education the *Herald* published a signed statement by Leonard A. Busby, president Chicago Surface Lines, who explained the problems of operation in the loop district. Mr. Busby said that the speed of surface cars is cut down 40 per cent through the loop during the morning and evening rush hours because of teams on the tracks and automobiles parked beside the curb. As for blockades, those resulting from teams and automobiles becoming stalled in the street or broken down on the tracks are greater than all others combined. The records of the operating department show that 56 per cent of all blockades which are of a nature serious enough to require the services of a wreck wagon are due to the breaking down of vehicles on the track, or to the overloading of vehicles which get on the track and cannot get off without the services of a wreck wagon. The other blockades requiring the services of a wreck wagon are due to derailment, fires, overhead troubles and miscellaneous causes.

These figures, Mr. Busby said, do not take into account the vastly greater volume of delays due to vehicles holding the track, thereby delaying the cars and making the headway irregular. Nor do they take into account the fact that in the congested districts where cars are operated up to track capacity about 25 to 30 per cent of the actual track capacity on a given street during rush hours is at times used by vehicles which displace a large number of cars. These, then, are obliged to stand in line waiting for an opportunity to get through.

This condition is growing steadily worse, Mr. Busby stated. Clearing the tracks of vehicles in the congested district during the rush hours would at the present time afford greater relief to the public than could be obtained by any other measure under existing track facilities. This would, of course, involve the necessity of preventing the parking of automobiles and other vehicles along the curb on narrow streets.

Year's Effect of the Seattle Jitney

Many Jitneys Are Still in Operation, but This Problem Is Secondary to That of High Cost of Materials

The long-expected demise of the jitney as an agent of transportation in Seattle, Wash., has failed of accomplishment, according to the annual report presented to the Mayor of that city by A. L. Valentine, superintendent of the city department of utilities and covering a period from Nov. 30, 1915, to Nov. 30, 1916. The report says:

"Two hundred and seventy-five jitneys are still doing business during the evening rush period, lesser number by about seventy-five than were in operation at the time of the filing of our last report. During the summer months, at a time when prohibitive legislation seemed imminent, and when the price of the required $2,000 bond had soared from $175 to $250 per annum, there was a noticeable falling off in the number in operation, but this condition did not long endure, and during the last few months the number has been slowly increasing. Applicants for drivers' licenses are being constantly examined and passed upon, and if the older drivers are learning that the business cannot be conducted at a sufficient profit, if the increasing industrial activity is drawing numbers of them to more lucrative fields of endeavor, there is, nevertheless, no lack of new material to take their places and continue where they left off. A total of 749 applicants were examined for licenses during 1916. Beyond the raising of the fares on certain of the routes, there have been no changes or improvements of note. None of the consolidations of drivers has succeeded in holding together to any definite purpose; none of the promised capital which was to take hold of the industry, conduct it on a large scale and give it a definite status, has materialized.

"During the year ending Dec. 1, 1915, the gross railway receipts of the Puget Sound Traction, Light & Power Company fell off nearly $620,000 as compared with the same period of the previous year. For the year ending Dec. 31, 1916, the receipts show a gross gain of about $72,000 as compared with the 1915 period, but are still far short of 1914. This sum of approximately $1,270,000 represents the extent to which the company's receipts have suffered through jitney competition.

"In any discussion of street railway finances, and looking at the matter from every angle, the financial status of a city's transportation system cannot be otherwise than of interest to all residents of the city, neither can we overlook the fact that the high cost of materials in living expenses are just as great in this quarter as they are in the home of the most humble citizen. In fact, it has come to a point where it is not so much a question of jitney competition with the street railway company, not so much a question of whether or not the percentage of the gross receipts shall be paid to the city treasury, and whether or not the company shall pay its right of way and fulfill other franchise obligations. All these questions become secondary in the face of the problem of meeting the enormous increase in the cost of all necessary materials. Lumber, steel, copper, wages, everything, have all tended upward at an appalling rate, and the end is not in sight, while the price of a street car ride remains the same. And so it is fair to conclude that the jitney bus has been only one of a number of elements, the advent of which has proved to be very calamitous to the holder of traction securities."

Railway Abandons Jitney Service

Everett Company Decides Against the Auto After Trial Service

The Everett Railway, Light & Power Company, a subsidiary of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has terminated its jitney service in Everett. The order was issued by D. C. Barnes, general manager of the company. He said:

"We have decided to withdraw our jitneys, for the time being at least, because our experience has clearly demonstrated that it is not an economically successful means of transportation.

"In our eighteen-months' operation, the cost of auto transportation has been 2 cents a seat mile, as compared with a cost of ¾ of a cent for street car service. Even by picking the cream of the business, the revenue of the jitneys in every month of their operation has fallen considerably below the expense of operation with a suitable allowance for depreciation. We are convinced that the jitney cannot survive the time which must eventually come when it will be required to give service equivalent to the street car, grant free transfer, and contribute to paving maintenance. The jitney has shown that the public wants frequent service and the new light weight cars which are operating on Hewitt Avenue are the answer."

Ten Ford machines were included in the equipment of the company, but the number of cars in service fluctuated with the volume of traffic during various hours of the day.

Non-Advertising Safety Posters

Kansas City Railways Enlist Co-operation of Drivers and Chauffeurs in Observing Safety Suggestions

As one phase of the safety work of the Kansas City (Mo.) Railways a group of safety suggestions was prepared, directed especially to teamsters and chauffeurs. Large cards, 16 in. x 24 in., have been printed, and posted in garages, barns, and similar places. Superintendents of barns and owners of garages have taken pains to direct the attention of drivers to the bulletins, with substantially good results in the reduction of collisions with street cars.

The bulletins do not mention the name of the Kansas City Railway Company. They read as follows:

A FEW SAFETY SUGGESTIONS

There are many accidents between street cars and vehicles of all kinds. Delays are caused and property is wasted.

Many accidents can and should be avoided.

Motormen are human and work for a living just as you do and you should show them every consideration that you would ask them to show you.

Cars are seldom broken, wagons and automobiles often are.

Cars do not have pain, drivers and horses do.

ACT AS YOU WOULD WANT THE DRIVER TO ACT IF YOU WERE A MOTORMAN.

The following rules should be rigidly adhered to:

Rule No. 1. When approaching a car track from a side street slow down so that you can stop on short notice. Cars are heavy and cannot stop as quickly as automobiles and other vehicles.

Rule No. 2. When driving on streets where there are car tracks drive between curb and track whenever possible.

Rule No. 3. Do not pull on to track to pass vehicle ahead of you until after you have looked back to see if car is approaching.

Rule No. 4. When passing car ahead do not pull to the left on to opposite track. Car may be approaching.

Rule No. 5. When passing a standing car have your vehicle under control. A passenger may suddenly appear from behind car.

Fare Increases Protested

Protests have been filed with the Public Service Commission for the Second District of New York against the contemplated fare increases on the lines of the Schenectady Railway and the Fonda, Johnstown & Gloversville Railroad. Mayor George R. Lunn, of Schenectady, is leading the opposition to the proposed increases. He is backed, however, by practically all the Chamber of Commerce committees as well as the civic organizations of the cities and towns along the lines affected.

The Schenectady Railway proposed to increase its fare by 5 cents between Troy and Schenectady by increasing the number of fare zones between the two cities from four to five, and increasing the fare from 30 to 35 cents between Schenectady and Saratoga Springs by the addition of another fare zone.

New specific tariffs were filed for each station on the Fonda, Johnstown & Gloversville Railroad. Generally speaking this would practically mean graded increases between the cities of Gloversville and Schenectady and Schenectady, Troy and Saratoga as well as intermediate points.

The only variance from the above mentioned protest was the point raised by the representatives of the city of Watervliet, in that they claimed that the franchise granted to the Schenectady Railway limited it to its present fare rates between Watervliet and Schenectady, and that any deviation therefrom affected the franchise.

The commission on its own motion agreed to enter into an investigation as to the reasonableness of the rates proposed, and on Jan. 25, 1917, issued an order suspending the proposed fare increase until April 15 or until a later date if a further suspension would be necessary. No date has as yet been set for a hearing in the matter.

Atlanta Has Company Publication

It Is Built on the Form of a Daily Paper—No Advertising Accepted

Here We Are is the title of a monthly whose publication has just been begun. It is issued for distribution among employees, officers and owners of Georgia Railway & Power Company, Georgia Railway & Electric Company, Atlanta Gas Light Company, Atlanta Northern Railways, all of Atlanta, Ga., the Suburban Gas & Electric Company, Decatur, Ga., and the Carrollton (Ga.) Electric Company. In make-up it differs radically from nearly all other company publications, the page size being 19 in. x 12½ in. This admits of five 2¼-in. columns. There are four pages in the first issue, which is dated Feb. 1, 1917.

The material is patterned also on the daily newspaper and consists of short articles with crisp heads. The material relates not only to the internal news of the company, but to its new construction plans. A special notice says that no advertising will be accepted.

Advertisements Removed from Outside Cars.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has ordered all advertisements removed from the outside of its cars. The Trenton City Commission recently adopted an ordinance prohibiting advertisements being displayed on vehicles and by "sandwich" men.

Columbus Civic Bodies Plan Re-routing.—Representatives of twenty-seven civic organizations in the city of Columbus, Ohio, have undertaken to formulate a plan of re-routing and they declared at a meeting on Jan. 31, that it is their intention to follow Mayor Karb's suggestion to map out a plan that will be of the greatest benefit to the majority of the people of the city.

Grade-Crossing Accident in Joplin.—Eight men were badly hurt when a work car on the Southwest Missouri Railroad, Webb City, Mo., was struck by a Frisco passenger engine on East Fourth Street in Joplin at 1.15 p. m. on Jan. 23. The work car was demolished and the engine was overturned. All the injured were members of the interurban line's work crew.

Texas Parlor Car Service in April.—The Texas Electric Railway, a consolidation of the Texas Traction Company and Southern Traction Company, expects to begin the operation of the previously announced parlor-car service on its lines from Dennison to Waco and Corsicana on April 15. According to Burr Martin, general manager of the lines, an extra charge of 25 cents will be made for the parlor-car privilege.

Boston Elevated Creates New Department.—The Boston Elevated Railway has consolidated the department of surface lines and the department of traffic into a new department, to be known as the department of surface transportation. Edward Dana, at present superintendent of traffic, has been appointed manager of surface transportation and has been given charge of the new consolidated department and will hereafter be responsible for the operation of all surface line service. C. R. Tripp, at present superintendent of surface lines, is appointed supervisor of surface lines, reporting to the manager of surface transportation.

Memphis Company Celebrates Accident Reduction.—According to figures given out by E. W. Ford, general superintendent of the Memphis (Tenn.) Street Railway at a "Safety First" banquet on Jan. 16, in 1912 the company

recorded 3496 accidents, while in 1913, when the safety committees were organized, there were 2514 accidents. The reduction has followed each year until 1916 showed only 1726, a decrease of 50 per cent. A comparison of the number of controversies, under which head appears "fighting and ejectments," showed that in 1912 238 persons were ejected for fighting, while last year only 127 were listed under this head. There were only 685 collisions with vehicles last year as against 1401 in 1912; 1008 in 1913; 586 in 1914, and 652 in 1915.

Commissioner Woods Urges Traffic Changes.—The wisdom of appointing a traffic commission to work out and recommend a plan for handling traffic in New York City in view of the increasing difficulty and dangers of the traffic problem has been urged by Arthur Woods, Police Commissioner, in a letter to Mayor Mitchel. Among other matters to be considered by such a commission, the letter suggests opening up various arteries of travel by removing pillars of elevated lines and placing them on the sidewalk at the curb lines, and by reducing the width of sidewalks along certain sections of Madison and Lexington Avenues and along Central Park West. The letter also suggests working out arrangements whereby certain classes of vehicles could be kept off crowded streets at busy hours, and whereby a considerable portion of the traffic could be done at night.

Full Service Established After Fire.—Full service has been established on the lines of the Eastern Pennsylvania Railways, Pottsville, Pa., after interruption by the fire of Jan. 6, which damaged the power station and repair shops at Palo Alto. For a few nights after the fire only partial railway service could be maintained, but the full lighting load was met. The failure of two converters due to fire damages caused a shortage of power and the management was further handicapped by the losses of buildings and other equipment. A portable substation was obtained from the Monongahela Valley Traction Company at Fairmont, W. Va. It arrived in Palo Alto at noon on Jan. 28, and was ready for operation early on the morning of Jan. 29. It was an important factor in helping to restore traffic. The normal number of cars has been operated now for some time and work of reconstruction is being carried out.

240,211,749 Passengers Carried in St. Louis in 1916.—According to the quarterly report filed on Jan. 15, with the City Register by the United Railways, 19,000,000 more passengers were carried during the year 1916 than during the year 1915. A total of 62,907,496 passengers was carried in the last three months of 1916. This is an increase of more than 3,700,000 over the preceding three months and is 5,200,000 more than in the corresponding three months in 1915. The 3,700,000 extra passengers in the last three months were transported with the use of an average of only five more cars on week days than in the preceding quarter and nine more cars on Saturdays. A total of 1267 week-day cars were used in the last three months and 1262 were used in the previous three months. In 1916 a total of 240,211,749 passengers was carried, as against 221,039,858 in 1915. The cars made 6,495,454 trips in 1916 and 6,147,822 trips in the preceding year.

New York Railways Depicts Congestion Crisis. — In line with the recently adopted plan of the Interborough Rapid Transit Company, New York, to issue for public perusal bulletins from time to time as special problems arise, the New York Railways is now represented in a similar manner by the publication of a new illustrated bulletin, entitled *New York Railway Service.* The first issue, dated Jan. 29, is devoted entirely to the crisis in street congestion in New York City, which is characterized by serious blockades from building operations, subway construction, sewer and water main excavation and repaving, by a grave shortage in the Street Cleaning Department's snow fighting forces and by an enormous increase in the number of automobiles. As relief measures which would help the situation, the bulletin suggests that vehicles be not allowed to stand along the curb of certain designated streets, that traffic officers co-operate closer at certain localities in regulating traffic, and that certain crosstown streets be limited to one-way traffic during rush hours.

Personal Mention

W. B. Savage has been appointed claim agent of the Tidewater Power Company, Wilmington, N. C.

J. J. Kilkenny has been elected vice-president of the Sacramento Valley Electric Railroad, Dixon, Cal.

J. H. Robertson, superintendent of the Salisbury & Spencer Railway, Salisbury, N. C., has been appointed local manager of this company, succeeding R. J. Hole.

K. D. Leavitt, master mechanic of the Public Utilities Company, Evansville, Ind., has resigned to become master mechanic of the Northern Ohio Traction & Light Company, Akron, Ohio.

William Hardecker, who has been connected with the Pottstown (Pa.) branch of the Reading Transit & Light Company, has become superintendent of the street railway facilities in Lebanon.

G. Harold Smith, assistant engineer of the Rockford and Interurban Railway, Rockford, Ill., has been appointed acting chief engineer of the company, until a successor to Ward S. Hubbard is selected.

Edward Dana, superintendent of traffic of the Boston (Mass.) Elevated Railway, has been appointed manager of surface transportation in charge of the new consolidated department, which includes the department of surface lines and the department of traffic.

R. B. Stichter, vice-president of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., while crossing a street in Dallas on Jan. 24, was run over by an automobile, and seriously injured. According to a local newspaper report, he will probably recover.

G. R. Tripp, superintendent of surface lines of the Boston (Mass.) Elevated Railway, has been appointed supervisor of surface lines, reporting to the manager of surface transportation in the new consolidated department which includes the department of surface lines and the department of traffic.

R. H. Sperling, formerly general manager of the British Columbia Electric Railway, Vancouver, B. C., and latterly assistant chairman and a director in London, England, has resigned those positions on taking a commission in the British army, and has been appointed one of the advisers to the directors.

A. E. Ward, who in the past has been located in Reading, Pa., with the Reading Transit & Light Company, has been transferred by that company to Lebanon and appointed general manager of the Lebanon division, with full authority in the operation of the electric and street railway service there.

W. S. Murray has been appointed assistant to the president of the Housatonic Power Company, effective on Jan. 1, 1917. This is one of the subsidiaries of the New York, New Haven & Hartford Railroad and the work includes caring for the engineering, operation and construction of the power system. The Housatonic Power Company develops and transmits high-voltage electricity in the western and middle sections of Connecticut, using steam and hydroelectric stations, and among its principal customers are the Connecticut Company and the United Electric Light & Water Company. Owing to its growing business it has many interesting power and transmission problems, a recent one being the supply of power to meet the growing demand of the United Electric Light & Water Company at New Britain. To meet this demand the Housatonic Power Company has ordered the necessary electrical apparatus in the form of step-up and step-down transformers, frequency changes and switchgear to transmit 6000 kw. to a frequency change station at New Britain. The transmission potential will be 33,000 volts, with duplicate three-phase circuits. The wires will be No. 00 copper, supported on steel towers and the distance is approximately 38 miles. Mr. Murray's work in connection with the Housatonic Power Company will in no way affect his re-

lations with the firm of McHenry & Murray, with which he remains a partner.

G. Gordon Gale, general manager and chief engineer of the Hull (Que.) Electric Company, has been appointed vice-president and general manager, succeeding E. W. Beatty, who, however, remains as a director. Mr. Gale will continue to attend to the engineering work. He was graduated from McGill University and prior to 1907 was assistant engineer of the Canadian Rubber Company's electrical plant. From 1907 to November, 1908, he was superintendent of power of the Hull Electric Company and from November, 1908, to 1909, was acting superintendent of the company. From 1909 to June, 1914, Mr. Gale was general superintendent of the company. In 1914 he was appointed manager. Mr. Gale is an associate member of the Institute of Electrical Engineers and the Canadian Society of Civil Engineers.



G. GORDON GALE

Clarence W. Huntington has been elected president of the Richmond Light & Railroad Company, succeeding the late Charles W. Hotchkiss, and also chairman of the board of the Virginian Railway, with headquarters at New York. Mr. Huntington was born in 1857, at Newark, N. J., and was educated in the public schools, the Newark Academy, and Dorchester High School, Boston. He began railway work in 1876, as a freight brakeman on the Chicago, Rock Island & Pacific Railroad, and for sixteen years held various positions on the same road. He was then for one year assistant superintendent of the Des Moines Northern & Western Railroad and later for one year was superintendent of the same road. From 1894 to 1902 he was general superintendent of the Iowa Central Railroad, and then went to the Central Railroad of New Jersey as general superintendent, with headquarters at New York. In February, 1914, he was elected vice-president and general manager of the Minneapolis & St. Louis Railroad, with headquarters at Minneapolis, Minn., from which office he resigned to accept his present position.

E. A. Maher, Sr., whose election as president of the Third Avenue Railway System, New York, was announced in last week's issue, has become by the assumption of his new position the head of a property aggregating about 370 miles of single track, including subsidiary companies, connecting Manhattan with the Bronx and extending out into the suburban towns of Mt. Vernon, New Rochelle, Bronxville, Larchmont, Tuckahoe, Pelham, Yonkers and Hastings. Mr. Maher, owing to the broad executive training and practical experience in dealing with the public which he gained from his earlier positions as president of the Board of Supervisors of Albany, as a member of the Assembly from that city and later as Mayor of Albany for two years, is eminently well qualified for the exacting demands of his new office. This broad training has been supplemented by an expert knowledge both of public utility operation and of the special problems attending the system with which he is connected, based on twenty-five years of street railway work, including sixteen years as president of the Union Railway and nine years as general manager and later vice-president of the Third Avenue Railway.



E. A. MAHER

Obituary

Charles T. Schoen, one of the foremost figures in the development of the steel car industry of the country, died on Feb. 5, at his home, at Rose Valley, Moylan, Pa. He was seventy-two years old. Mr. Schoen was born in Delaware and was educated in Wilmington. He worked there with his father, Henry Casper Schoen, in whose shops he learned the cooper's trade. About 1864 he removed to Philadelphia to assume a position with Charles Scott, who was engaged in the manufacture of car springs. Mr. Schoen later developed pressed steel equipment and fittings for wooden freight cars, including car trucks, and finally the complete steel car. The first company to manufacture the steel cars was known as the Schoen Pressed Steel Car Company, and its extensive plant was established in 1889 at Schoenville, near Pittsburgh. Out of this company afterwards grew the reorganized Pressed Steel Car Company. His connection with this industry ceased in 1902. He also produced a solid forged and rolled steel wheel. A plant was established adjoining his former car plant at Schoenville and also in Leeds, England, which now is being used to produce munitions. In 1907 Mr. Schoen sold his plant at Schoenville and his patents to the United States Steel Corporation, and returned to his estate. He is survived by his widow and three daughters.

George Henry Hill, assistant engineer railway and traction department General Electric Company, died at his home in Schenectady on Jan. 31, 1917, after a short illness from pneumonia. At the time of his death he was less than forty-five years of age. This unfortunate event deprives the General Electric Company of one of its most useful and highly-appreciated engineers, and the profession of electrical engineering of a vigorous and well-balanced analyst of its problems, particularly those relating to control of electrical apparatus and heavy electric traction. His reputation for fairness and square dealing, also, invariably won for him an unswerving loyalty among his associates in business and in private life.

Mr. Hill's career shows what can be done by concentration of purpose and ingenuity in overcoming practical and theoretical difficulties. His work was consistent in plan and purpose from the time of his completion of the electrical engineering course at the Johns Hopkins University, Baltimore, Md., in 1895, until his death nearly twenty-two years later. Immediately after graduation he joined the staff of Frank J. Sprague, who at that time was engaged in the development of electrically-operated elevators and multiple unit control for railway service. He soon became chief of construction of the elevator department of the Sprague Electric Company and, when this company gave up its elevator business in 1900, he became chief engineer of the company with headquarters at Bloomfield, N. J. Here with Mr. Sprague he devoted his attention to development of multiple-unit control for railway trains.

In 1902 the General Electric Company took over the Sprague patents and interests, and Mr. Hill went to Schenectady to assist in the further development of train control. He became assistant to F. E. Case and was actively connected with the manufacture of car equipment for the Manhattan Elevated Railroad in New York, the Boston Elevated Railway, the Interborough Rapid Transit Company, the Northwestern Elevated Railroad, the Philadelphia Rapid Transit Company and others. He did work also in connection with the Baltimore & Ohio, New York Central and other electric locomotives. After four years in this work he became assistant engineer of the railway and traction department where he has since aided in the solution of many difficult problems. Articles from his pen on railway subjects have frequently appeared in the technical press and in the proceedings of the A. I. E. E. Two years ago he served a term effectively as chairman of the local section of this association. During the course of his studies he made many useful inventions in the railway and other electrical fields and was granted nearly fifty patents. The editors of the ELECTRIC RAILWAY JOURNAL have been assisted in their work on many occasions by Mr. Hill, and at the time of his death he had in preparation for this paper an article on an important electric railway subject.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Duquoin, Christopher & Eastern Traction Company, Duquoin, Ill.**—Incorporated to construct a line out of Duquoin through the towns of North City, Christopher, Buckner, Orient and West Frankfort to Elkville, Hallidayboro, De Soto and Carbondale. Capital stock, $6,000.

***Ocean City & Fenwick Island Railway, Ocean City, Md.**—Incorporated to construct an electric railway 8 miles up the beach in Ocean City to Fenwick Island. The construction contract has been let to Thomas E. O'Connell of Phoenixville, Pa. The company is in the market for about 10 miles of relaying rails weighing from 60 to 70 lb. per yard; also for necessary materials for overhead work and four trolley cars of the open type, with running boards. Officers: W. B. S. Powell, president; C. Edward Shute, secretary; Harry J. Cropper, vice-president, and Frank W. Truitt, treasurer, all of Ocean City.

FRANCHISES

Fullerton, Cal.—An ordinance providing for a franchise for the Pacific Electric Railway through Fullerton on the route to Anaheim has been adopted by the City Council of Fullerton. The franchise is indeterminate as to the number of years that the line may be maintained, providing that it can be taken over by the city of Fullerton at any time after five years by condemnation. Work on the Pacific Electric line to Anaheim has been begun and it is expected that the line will be completed in four months.

Waterbury, Conn.—The Public Utilities Commission of Connecticut has approved the plans of the Connecticut Company for the construction of double tracks on West Main Street and private right-of-way in Waterbury..

Chicago, Ill.—The City Council of Chicago has referred to the transportation committee an ordinance for the extension of the 103d Street line of the Chicago City Railways from Cottage Grove Avenue east to Torrence Avenue.

Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company has asked the City Council for a franchise to construct an extension of its Pontiac Street line.

Baltimore, Md.—The Board of Estimate has approved the ordinance authorizing the United Railways & Electric Company to lay switches and turnouts in the construction of the new Liberty Heights Avenue car line, which is being constructed as a more direct route from Garrison Avenue to the center of the city.

Tonawanda, N. Y.—The International Railway has received a franchise from the City Council to construct an extension of its Grand Island Ferry line along the River Road to the Wickwire Steel Company's property in Tonawanda. The proposed line will be 7700 ft. long.

TRACK AND ROADWAY

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company has concluded a contract with the Arkansas Zinc & Smelting Company of Van Buren to extend its Van Buren line to the smelter. The extension will be 1 mile long and will cost about $20,000. Work on the new extension will begin at once and will be pushed through to completion as fast as material and labor can be had.

Pacific Electric Railway, Los Angeles, Cal.—R. Sherer Company, Los Angeles, has received a contract from the Pacific Electric Railway for grading the roadbed and building bridges and culverts on its proposed line from La Habra to Fullerton. The cost will be about $54,000.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—It is reported that the Oakland, Antioch & Eastern Railway plans to construct an extension from Pittsburg to Antioch within the next few months.

San Diego & South Eastern Railway, San Diego, Cal.—The Utah Construction Company, Ogden, has received a contract from the San Diego & South Eastern Railway to construct about 20 miles of railway.

Municipal Railways of San Francisco, San Francisco, Cal.—A municipal railway line up Market Street from the Ferry through the Twin Peaks Tunnel to Sloat Boulevard, and the connection of the completed Church Street line with it, has been authorized by the Public Utilities Committee of the Board of Supervisors. It will entail altogether an expenditure of $655,000, as follows: Kearny and Market Streets to Van Ness Avenue and Market Street, $250,000; Van Ness Avenue and Market Street to Church and Sixteenth Streets, $110,000; Church and Market Streets to the mouth of Twin Peaks Tunnel, $82,000; through the Twin Peaks Tunnel to Sloat Boulevard, $213,000. The construction of the lines was authorized under the recent decision of Federal Judge Hunt, which gives the city the right to parallel the tracks of the United Railroads. City Engineer M. M. O'Shaughnessy was directed to order the rails for the construction of outer tracks on Market Street from Kearny Street to Van Ness Avenue, and from Church Street to the tunnel mouth. These rails will cost $37,605. By taking advantage of the option it had to order additional rails. The city now will begin to get deliveries by June 29. The entire projected lines will be completed and cars operating over them by Nov. 1. The Church Street-Van Ness Avenue line will be in operation by July 1. In addition to authorizing the city engineer to order the additional rails, the Public Utilities Committee recommended that the Board of Works be authorized to call for bids for the construction of the different lines.

Meriden, Middletown & Guilford Railway, Meriden, Conn.—Francis Atwater, New Haven, has been appointed receiver for the Meriden, Middletown & Guilford Railway. The railway was incorporated in 1907 to construct a line between East Meriden and Guilford, but little work has been done on the line.

Peoria (Ill.) Railway.—This company will double-track its Adams Street line from Western Avenue to Nevada Street, Peoria.

Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind.—A contract has been awarded to the Pennsylvania Steel Company, Pittsburgh, Pa., for new 125-lb. steel rails for the north side line of the Chicago, South Bend & Northern Indiana Traction Company between South Bend and Mishawaka. The cost of the new rails, new section work and new paving will be about $155,662.

Manhattan City & Interurban Railway, Manhattan, Kan.—A bond issue of $200,000 has been voted by the stockholders of the Manhattan City & Interurban Railway to pay indebtedness and to make extensive improvements.

Mankato (Minn.) Electric Traction Company.—A contract has been entered into between the Mankato Electric Traction Company and the city of Mankato whereby the company will pay $5,000 to the city toward the construction of a bridge to North Mankato and an additional $300 toward defraying the expenses of constructing cables and trolleys across the structure.

St. Paul (Minn.) City Railway.—This company plans to construct extensions of its East Seventh Street and St. Clair Street lines.

***Freehold, N. J.**—Plans are being revived to construct an electric railway between Freehold and Asbury Park and the Civic Development Company of Farmingdale has been incorporated with a capital of $50,000 to advance the project. More than $100,000 has been subscribed toward the proposition and $25,000 actual cash has been paid in. The incorporators of the Civic Development Company are: William J. Lansley, Farmingdale; Clarence Hodson, Newark, and L. C. Tompkins, Morristown.

***Binghamton, N. Y.**—Plans are being revived for the construction of a line from Binghamton to Utica. Franchises granted in 1907 have been renewed. The plan includes the construction of a large power house at Whitney's Point. Thomas McBride, Clinton, is interested.

Brooklyn (N. Y.) Rapid Transit Company.—Operation of the Jamaica Avenue elevated line of the Brooklyn Rapid Transit Company from Cypress Hills to Spruce Street, Richmond Hill, will be begun on April 1, and of the whole line to Grant Avenue, Jamaica, by Sept. 1. The line is 4½ miles long and will be operated in conjunction with the Broadway elevated line in Brooklyn and will connect with the express service over that division.

Panama Traction Company, Jamestown, N. Y.—Grading is now under way by this company between Sugargrove, Pa., and Busti, N. Y., and between Busti and Ashville, N. Y. It is expected that the line from Youngsville to Panama will be completed and in operation by next Fall. The engineers of the company are Graham & Chapman, Jamestown, N. Y. D. L. Davis, Jamestown, general manager. [Jan. 20, '17.]

Interborough Rapid Transit Company, New York, N. Y.—The new Astoria elevated extension connecting with the Queensboro subway was placed in operation by the Interborough Rapid Transit Company on Feb. 1. Plans have been made by the Public Service Commission for the First District of New York for the construction of an extension of the Eastern Parkway subway on Utica Avenue. The extension will be a three-track elevated line from Eastern Parkway to Flatbush Avenue. The cost is estimated at $5,210,536.

Manhattan & Queens Traction Corporation, New York, N. Y.—The Board of Public Works has ordered the Manhattan & Queens Traction Company to begin construction of an extension of its railway from Lambertville Avenue and Sutphin Road through to Springfield Avenue, Hollis.

Cleveland, Akron & Canton Terminal Railway, Cleveland, Ohio.—J. J. Breitinger, a director of this company, is authority for the statement that work will be started on the proposed freight subway under East Fifty-fifth Street, Cleveland, on April 1. A contract, amounting to $12,000,000 has been awarded to the Foundation Company, New York, and it is expected that the road will be in operation within two years. He said further that an amendment to the franchise would be asked of the City Council, allowing the company to change its route somewhat. [Dec. 9, '16.]

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—This company contemplates the construction of an extension from Seville to Wadsworth.

Youngstown & Niles Railway, Youngstown, Ohio.—Construction will be begun next spring by the Youngstown & Niles Railway on its proposed line to Niles. The new company is a subsidiary of the Mahoning & Shenango Railway & Light Company. The line will begin at the end of the Steel Street line and will continue westward on the south side of the river, passing through the new town of MacDonald and entering Niles at the south end of the Main Street bridge. A mortgage has been filed at the courthouse by the company to the Guaranty Trust Company, New York, as trustee to secure an issue of $10,000,000 of bonds to provide funds to cover the cost of building the road and care for future financial needs. J. P. Wilson, Youngstown, president. [Aug. 26, '16.]

Toronto, Ont.—Small towns along the Canadian-Niagara frontier have received a communication from the Ontario Hydro-Electric Association protesting the granting of permission to the Toronto, Hamilton & Buffalo Railway, to extend its line to Port Colborne. The steam line has asked for a franchise to construct a steam or electric line along the Canadian-Niagara frontier which would be in competition with the hydroelectric line which was approved at the special election in January.

Dover-Rossville Transit Company, Dover, Pa.—Construction work has been completed by the Dover-Rossville Transit Company on its trackless trolley line between Dover and Rossville, and operation will be begun soon. [Jan. 20. '17.]

Philadelphia, Pa.—Plans for the Darby elevated line, Philadelphia, have been completed and forwarded to the Public Service Commission of Pennsylvania, with an application for a certificate of convenience to authorize construction. This completed the plans for all the lines of the comprehensive system as specified in the transit ordinance approved by the Philadelphia Council in 1916. The parkway, subway and elevated plans were filed by the Transit Department when a hearing was held before the Public Service Commission several weeks ago. The ordinance authorizing the construction of the system provides also for the building of the necessary spurs northeast and northwest from the Broad Street subway, but the lines are not definitely fixed nor the routes determined. The council will have to approve the routes and authorize their construction.

Marlin-Temple Interurban Company, Marlin, Tex.—S. D. Hanna, chief engineer of the Marlin-Temple Interurban Company, has filed a report showing preliminary estimates of cost of construction, which is placed at $450,000. The engineer's report is based on a 1 per cent grade. The proposed line is 33 miles long, and will pass through Temple, Belfalls, Durango, The Falls and Marlin. It will cross the Brazos River on a bridge to cost $53,500. Work will be begun on the laying of rails immediately. [Jan. 20, '17.]

SHOPS AND BUILDINGS

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—This company contemplates the construction of large additions to its present carhouse and a new paint shop in Lewiston. The building will be one story high, of brick construction, and will cost about $18,000.

Twin City Rapid Transit Company, Minneapolis, Minn.—A new $90,000 carhouse will be built by the Twin City Rapid Transit Company at St. Paul. The new station will take care of 100 street cars, thirty-six in the carhouse and the remainder on outside storage tracks, and will include trainmen's club rooms and offices for foremen and clerks.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—This company will erect a new passenger station at Princeton.

POWER HOUSES AND SUBSTATIONS

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—This company, through its subsidiary, the Consumers' Power Company of Maine, is constructing on the Manistee and Ausable Rivers two new additions to its power system in Michigan. At the Manistee Junction dam 23,000 hp. will be in operation by next December and on the Ausable two plants of 12,000 hp. each will be ready by June, 1918. Already the company has four plants on the river, with a total combined capacity of 60,000 hp. The demand for power in this section has increased 35 per cent during the past year.

International Railway, Buffalo, N. Y.—The International Railway will construct a new substation in Niagara Falls, N. Y. A site has been acquired at Allen Avenue and Twenty-fourth Street, and plans have been made for the erection of a brick and steel building to cost $31,000. Transformers and other electric equipment will cost approximately $150,000. The new station will not only supply the Niagara Falls local lines but will supply part of the power for the new Buffalo-Niagara Falls lines. The company has placed an order with the General Electric Company, Schenectady, for a 1000-kw. generator. Pending the completion of the new substation, the generator will be temporarily installed in the plant of the Niagara Falls Power Company. This will tend to relieve the shortage of power now being experienced by the company in the operation of its Niagara Falls local lines.

Richmond Light & Railroad Company, New Brighton, N. Y.—It is reported that the Richmond Light & Railroad Company plans to construct a new 6000-volt transmission circuit on both sides of Staten Island to afford improved lighting service to the different municipalities.

Northern Ohio Traction & Light Company, Akron, Ohio.—A 7500-kw. generating unit has been installed by the Northern Ohio Traction & Light Company in its substation at Akron, to be used until two new 20,000-kw. units have been installed. The first of these units has been delivered and will be in use in April. It is expected to have the second unit in operation in June. About 4000 hp. additional boiler capacity will be installed in the latter part of the year. The transmission and distributing lines of the company in the Canton-Akron district are to be extended materially this year.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Business Announcements Trade Literature

Observations on Car Motor and Control Purchasing

Suggestions Made by an Engineer Who Urges Closer Co-operation in Purchasing and Greater Exactness in Specifying

Last year the electric railways of the United States and Canada ordered 3942 new cars. These orders were placed by 250 roads, and 3420 of the cars were for passenger service. Fully 3200 of these cars required motor equipment, so that it may definitely be stated that for the year 1916 the average motor order per week day was for about thirteen cars. Many motors of course also were ordered for replacements.

Types and capacities of motors vary so widely that it would be difficult to approximate the sale value of the average car order. However, the duty which the motor car has to perform and the original and up-keep cost of the electrical equipment are sufficiently great in value to warrant the statement, based on experience, that electric railways could profitably afford to devote more engineering attention to motor buying. The thoughts here set down are based on a desire to bring about closer and more profitable co-operation between the buyer and seller of motor car electrical equipment.

Study Operating Conditions

Manufacturers of motor equipment invariably welcome an opportunity to help in the study of operating conditions. This will lead to the choice of the correct motor for the actual service desired. Any approximation of service conditions introduces estimations rather than definite calculations and thus may involve the correctness of the final choice. Descriptions of service conditions when given to a motor manufacturer may be accurately recited so far as they go, but in general it is safe to say that a more detailed analysis would bring out more accurate results. For example: Exactness in statements of the miles of operation in city, suburban and interurban territory are not always clearly set forth. Variation in these classes of service will sometimes show that the real conditions to be met are less severe or more severe than the average would have indicated, and therefore might involve inaccuracy in the recommendations made the manufacturer. It is not unknown for a manufacturer of motors to be confronted with conditions of service desired in which the total standing time is equivalent to the total running time. A statement of how the working and idle hours of a motor are to be distributed throughout the day will mean much in the consideration of the internal heating problem.

It is reported on reliable authority in connection with service conditions of a locomotive that where the question was asked, "How many hours a day would it be in operation?" the reply was to the effect that "It would not operate during the day, but merely at night."

In the setting down of the working conditions to be met by new motors, careful attention should be given to such items as stops per mile and their duration. Special inspection of the service with a stopwatch in hand may be necessary to bring existing data on stops down to date. All too frequently the statement of the average voltage over the line is the result of observation of the brilliancy of the lamps in the car rather than actual volt meter readings. The proper way to obtain the average voltage is to take ten-second voltmeter readings on the car during light-load and heavy-load period round trips.

The weight recited in connection with either an old or a new car is too often in guess work, and a variation of even more than a ton does not seem to call for careful weight-checking even though the weight to be moved is a most important factor in the choice and design of motor equipment.

It is often indicated by the buyer that such and such a motor is successfully performing service similar to the one under consideration, and therefore the buyer calls for "The same size motor." On inquiry it may be found that no real observations were taken to determine whether the service to be performed was or was not similar to that on which the old motors were supposed to be doing so well. Success is merely a relative term. A given company may be accustomed to certain conditions of failure which on another property would not be tolerated. This is one more reason for furnishing the motor manufacturer with complete data rather than permitting the choice of equipment to be based on the experience of any one man or group of men.

Make Specifications Definite

Definiteness in specifications for motor equipment is far more essential than for most any other class of material purchased by electric railways. Specifications requesting bids very often indicate conditions of service to be met, yet the full descriptions of service may be found to be incomplete. Time will not always permit the motor manufacturer to make detailed investigations for the purpose of verification. In such instances the bidder may find himself unable to make the best possible offering. Hence, the purchaser may not have the advantage of fully competitive bidding. Alternative propositions which may be submitted on the basis of assumed changes in requirements breed uncertainty.

For the reasons here set forth, an electric railway which contemplates the purchase of motors either for new cars or for replacing antiquated equipment is certainly warranted in analyzing its conditions in a most exhaustive way before requesting bids.

Specifying Axle Sizes and Gears

Now as to some of the details. Car wheels are practically standard and change mainly as to diameter, but motor gearing is built especially to suit the service conditions of a given road. Yet the choice of motor gearing too often is only considered, analyzed and determined upon after all of the rest of the equipment has been ordered. It should be remembered that if solid gears are to be used, which is the standard practice of the present day and logically so, the gears will be needed by the manufacturer almost as soon as the motor order is placed.

And while on the subject of gears, it might be well to point out that the allowance for press fits of the gear on the axle has been fixed by practice. The standard established is 0.001 in. allowance per inch of diameter of the bore of the gear, with a manufacturing tolerance of plus 0.0015 in. to minus 0.001 in. This factor is known, but in placing the order for the axles the diameter is not always indicated with due regard to manufacturing tolerance in finishing, and it will readily be seen that proper allowance for finishing in a given case may be wiped out by lack of consideration of this factor.

Forehandedness in ordering motor equipment also may bring about considerable relief to the manufacturer when fulfilling delivery requirements. The railway motor consists of approximately 175 different parts, made from about twenty-five different kinds of materials. Copper has always been and probably will remain for some time the most difficult portion of the motor to obtain. It is much easier to secure the ordinary commercial steel and wood entering into the construction of the car body than the cable, wire and copper parts needed in the construction of the car body, yet the amount, size and type are determined only too often at the very last moment—thus creating rush and confusion and possible delay in delivery.

Full standardization of equipment is something worth working for. If the day ever comes when the design of motors can be restricted to ten sizes or less for ordinary city

and interurban work, then the railways properly may demand a more finished product, which the manufacturers in turn will be able to deliver at less cost. Now-a-days it frequently happens that changes from a manufacturer's standards are requested apparently in order only to meet the notion of the buyer. Standards adopted by the manufacturers are the result of years of experience and exemplify the recorded wish of operating engineers throughout the country. Therefore, one who is specifying motors must be sure of his ground before setting his requirements against this array of experience and talent.

To summarize: The main things to be remembered are forehandedness in ordering, adherence to established standards where possible, and a thorough study of operating conditions crystallized into a definite set of specifications.

Relieving the Car Shortage

Business Men Urged to Work for Central Traffic Regulator—Railroads Need Reserve for Abnormal Times

In a recent answer to queries propounded by the American Druggists' Syndicate, A. H. Smith, president New York Central Lines, explained the causes of car shortage in this country and the means for its relief. In his opinion, the present congestion has been brought about entirely by an unprecedented and abnormal industrial situation, created somewhat by the catastrophe abroad. In addition to the enormous foreign traffic moving to and from tidewater, there has been set up a greater internal industrial situation in manufacture and commerce to provide these supplies. An unprecedented amount of ore, coal, coke, pig iron, billets, automobiles, motor trucks, munitions, food products and hospital supplies of all kinds are being handled, and in many cases half a dozen times. Within a few months the railroads were called upon to perform in many instances a service 40 per cent in excess of the preceding year. They had not the reserve for such a condition, and had been unable financially to anticipate it even if they would have been justified in so doing. Simultaneous with the demand for rail transportation, there occurred a demoralization of ocean shipping, owing to naval warfare and to the withdrawal of ships for other purposes. Traffic now has to be handled by embargoes in harmony with the ocean shipping, which naturally results in congestion in the interior.

The duration of the congestion, Mr. Smith says, is problematical. Unfortunately the very conditions which have produced the present prosperity have greatly increased the costs of material, including equipment, and the great shortage of labor not only retards construction work but embarrasses the daily operation of railroads. Notwithstanding the great cost of doing work at the present time, however, some large companies now have under contract and under construction hundreds of additional engines and thousands of additional cars which, as they arrive from time to time, will aid somewhat in facilitating the movement of traffic.

Mr. Smith believes that business men can render powerful aid, if not in overcoming the immediate situation, at least in preventing to some extent a recurrence of similar congestions. This aid must come through the creation of a healthy, honest, fair and intelligent public opinion towards railroads. Railroads must be permitted to build up a surplus and a reserve to meet the abnormal fluctuations in business. These fluctuations come suddenly and spontaneously, due to the abundance of crops and other natural conditions, which cannot be anticipated. As long as the railroads are required to exist on a miserly basis of the sparse year and the minimum traffic, it is useless to expect them to be ready for abnormal conditions and for the years of plenty.

The ultimate remedy seems to be that business syndicates, chambers of commerce, manufacturers' associations, traffic leagues and other various commercial and agricultural organizations must take up their own case by organizing in some way a national board of transportation, and undertake a campaign of education which will ultimately show the wisdom of creating a central authority to co-ordinate the work of federal and state commissions and regulate traffic. Before such a tribunal the board of transportation and the railroad interests could always meet and determine what really ought to be done in the way of rates and improvements, and the means of raising the money therefor.

Long-Period Deliveries for Raw Materials Continue

No general change in the raw materials delivery situation is apparent, except perhaps a psychological one on the part of buyers. In some few cases an improvement has already been noted. As a rule, however, deliveries of raw materials are just as long as they were in the fall of 1916, and in many cases longer. Brass manufacturers, steel manufacturers, foundries, etc., have sufficient orders on their books to take care of capacity production for many months, and will therefore be unable to materially better deliveries for some time. The shortage of freight cars for the past three months has been another very disturbing factor in this connection. Some roads have been forced to place embargoes on heavy freight, thereby adding a further delay in shipment.

In view, however, of the chaotic state of deliveries of twelve months ago, it can almost be said that at the present time deliveries are in an excellent state. As buyers formerly had been accustomed to receiving delivery in at least three weeks or a month, they were naturally disturbed when deliveries had to run into months and months. Factories were sending orders for rush delivery and making every effort to replenish and maintain their stock. When, however, buyers had reached that psychological state that they finally were satisfied that deliveries could not be made in as short a time as formerly, they accepted the situation as such, and made their plans accordingly. As a consequence, even though the deliveries are two, three, four, and sometimes more, times longer than prior to the war, there is very little suffering compared with what there was ten months ago. Contracts are being placed now for three-months' delivery with little more feeling in the matter than when they were placed for three weeks.

It took some time for manufacturers to adjust themselves to these conditions, but it is felt a favorable result has now been achieved. Buyers of finished products, however, have been slower in accepting these conditions, but now are rapidly coming to share their manufacturer's point of view.

CURRENT PRICES FOR MATERIALS

Quoted Thursday, Feb. 8.

Copper (electrolytic)	New York, 33 cents per pound
Rubber-covered wire (base)	New York, 38 cents per pound
No. 0000 feeder cable (bare)	New York, 37½ cents per pound
No. 0000 feeder cable (stranded)	New York, 35 cents per pound
No. 6 copper wire (insulated)	New York, 35 cents per pound
No. 6 copper wire (bare)	New York, 37 cents per pound
Tin (straits)	New York, 55 cents per pound
Lead	New York, 8½ cents per pound
Spelter	New York, 10¼ cents per pound
Rails, A. S. C. E., O. H.	Mill, $40 per gross ton
Rails, A. S. C. E., Bess	Mill, $38 per gross ton
Wire nails	Pittsburgh, $3 per 100 pounds
Steel (bars)	Pittsburgh, 3.25 cents per pound
Sheet iron (black, 28 gage)	Pittsburgh, 4.50 cents per pound
Sheet iron (galv., 28 gage)	Pittsburgh, 6.25 cents per pound
I-beams over 15 in.	Pittsburgh, 10 cents per pound
½-in. galv. extra high strength steel wire,	New York, $6.82 per 100 ft.
⅝-in. galv. high strength steel wire	New York, $3.41 per 100 ft.
¾-in. galv. Siemens-Martin wire	New York, $2.52 per 100 ft.
5/16-in. galv. Siemens-Martin wire	New York, $1.94 per 100 ft.
Galvanized barb wire and staples	Pittsburgh, 3.85 cents per pound
Galvanized wire (ordinary)	Pittsburgh, 3.65 cents per pound
Cement (carload lots) with rebate for sacks,	New York, $2.07 per barrel
Cement (carload lots)	Chicago, $1.96 per barrel
Cement (carload lots)	Seattle, $2.60 per barrel
Sand in large lots	New York, 50 cents per ton
Sand in large lots	Chicago, $1.25 per ton
Linseed oil (raw, 5-bbl. lots)	New York, 95 cents per gallon
Linseed oil (boiled, 5-bbl. lots)	New York, 96 cents per gallon
White lead (100-lb. keg)	New York, 9¾ cents per pound
Turpentine (bbl. lots)	New York, 52½ cents per gallon

OLD METAL PRICES

Copper (heavy)	New York, 29½ cents per pound
Copper (light)	New York, 24½ cents per pound
Red brass	New York, 19 cents per pound
Yellow brass	New York, 18 cents per pound
Lead	New York, 7.25 cents per pound
Steel car axles	Chicago, $34 per net ton
Zinc	8 cents per pound
Iron car wheels	Chicago, $18.50 per gross ton
Steel rail (scrap)	Chicago, $24.50 per gross ton
Steel rail (relaying)	Chicago, $30 per gross ton
Machine shop turnings	Chicago, $9.25 per net ton

Railways to Purchase Coal Mines

In order to improve existing fuel conditions on their various properties, the General Gas & Electric and Eastern Power & Light Companies, New York City, some time ago took under advisement the policy of furnishing fuel to their subsidiary properties through the purchase or lease of some desirable coal properties. A careful investigation was made of certain coal mines then on the market, and options have been taken on them. The closing of these options will depend upon tests now under way at the plants of subsidiary companies under actual operating conditions. Special attention has been given to the matter of cars and transportation facilities in selecting the location of these mines, and it is felt that satisfactory service is assured.

ROLLING STOCK

Eastern Pennsylvania Railways, Pottsville, Pa., are in the market for five car bodies to replace the equipment lost in a recent fire.

Tacoma Railway & Power Company, Tacoma, Wash., plans to spend $70,000 for new cars. In addition, heaters will be purchased for twenty-one cars not having them at present.

International Railway Company, Buffalo, N. Y., has purchased five wooden passenger coaches from the Pennsylvania Railroad and will have them rebuilt for use on the new Buffalo-Niagara Falls line which will probably be placed in operation in the spring. The electrical equipment will be furnished by the General Electric Company.

Interborough Rapid Transit Company, New York, N. Y., is in the market for 310 steel subway cars, 217 of which are to be motor cars and ninety-three trail cars. An option to purchase an additional 167 car bodies of which 120 will be motor cars and forty-seven trail cars is included, and will be exercised within six months of the date of the proposal.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 27, 1917, as having purchased thirty-five steel cars for service in the Cambridge subway and Dorchester tunnel extension to Andrew Square, has specified the following details for this equipment:

Builder of car body, Pressed Steel Car Company	Bumpers ..Hedley anti-climber
Type of car.....Closed, motor	Cables .....Westinghouse
Seating capacity...Seventy-two	Control...Westinghouse automatic line field control
Weight (car body only), Approx. 41,360 lb.	Couplers..Tomlinson, Ohio Brass
Bolster centers, length, 51 ft. 0 in.	Door operating mechanism, National Pneumatic
Length of body, 69 ft. 2½ in. over bumpers	Gears and pinions..Westinghouse
Width over sills.....9 ft. 6 in.	Journal boxes.....Symington
Width over all.....9 ft. 6 in.	Motors, type and number, 2 West. 557-A-1
Height, Rail to top of floor 50 in.	Motors .....Inside-hung
Body .....Metal	Seats, style .....Longitudinal
Interior trim .....Enameled	Seating material .....Carpet
Roof, type..Modified steam car	Trucks, type, Brill 27 MCB-2 and 3
Underframe .....Metal	Ventilators .....Perry
Air brakes .....Westinghouse	Wheels, Trailer 31 in., motor 34 in.
Axles .....Carnegie Steel	

The cost of these cars complete will be about $18,500 each, compared with $11,415 each for similar cars in 1912. Delivery will be made in September of this year.

TRADE NOTES

Farley Gannett, consulting engineer, Harrisburg, Pa., has changed the firm name to Gannett, Seelye and Fleming. Mr. Seelye has been a member of the firm since its organization, Aug. 1, 1915, and Mr. Fleming since February, 1916. On account of expanding business, the firm has found it necessary to change the location of its offices, and after Jan. 15 will occupy offices at 204 Locust Street, Harrisburg, Pa.

General George W. Goethals announces that he has opened consulting offices in the Wall Street Exchange Building, 43 Exchange Place, New York. He has associated with him experienced specialists and will engage in a general consulting practice in civil, electrical, mechanical and hydraulic engineering. Special attention will be given to examinations and reports on canals, harbors, dry docks, terminals, dams, water-power development, water supplies, purification of tropical waters, refrigeration, reinforced concrete structures, organizations, management and public utilities.

Walter Kidde, engineer-constructor, New York, has incorporated his organization under the title of Walter Kidde & Company, Inc., with headquarters at 140 Cedar Street. Mr. Kidde began business in 1900 and has done a large amount of work in the construction and equipment of factories. One of his most recent commissions is the plant of the American Hard Rubber Company, at Akron, Ohio. The officers of the new company are: Walter Kidde, president; B. G. Worth, vice-president; I. R. Lewis, secretary and treasurer. These are all members of the board of directors, which also includes Henry Lang, who is vice-president of the Ingersoll-Rand Company, and E. S. Boyer, who is associated with the American Hard Rubber Company.

ADVERTISING LITERATURE

Cooper-Hewitt Electric Company, Hoboken, N. J., has prepared bulletin No. 67, descriptive of its P, L, H and K lamps for direct-current indoor lighting.

United Hammer Company, Boston, Mass., is distributing a twenty-four-page booklet on Fairbanks power hammers. In this booklet, five different types of hammers, made by this company, are described and illustrated.

Harrison Safety Boiler Works, Philadelphia, Pa., has issued publication No. 710 on "Cochrane" heaters for use in heating, metering and softening water for boiler feed and other purposes.

Westinghouse Lamp Company, New York, N. Y., announces the construction of a large factory at Trenton, N. J., for the manufacture of incandescent lamps. The site for the factory covers about five acres, upon which will be built a plant of 200,000 sq. ft. of floor space. The contract has been awarded to the Stone & Webster Engineering Association and the cost of the buildings and equipment will amount to more than $1,000,000. When in full operation, the lamp factory will employ about 600 people, manufacturing approximately 1,500,000 Westinghouse Masda lamps per month.

Harvey Fisk & Sons, New York, N. Y., have issued 'United States Bonds, Historical and Descriptive," a seventy-four page pamphlet which contains an historical sketch tracing the fluctuations in the Government's debt from about $75,000,000 in 1791 down to the present time when the debt amounts to less than $1,000,000,000. The different outstanding issues of United States Government bonds are described. The portions of the Federal Reserve Act dealing with the refunding of United States bonds are analyzed and all rulings in regard thereto of the Federal Reserve Board and of the United States Treasury Department are printed. Existing provisions of law for new issues of United States bonds are clearly set out.

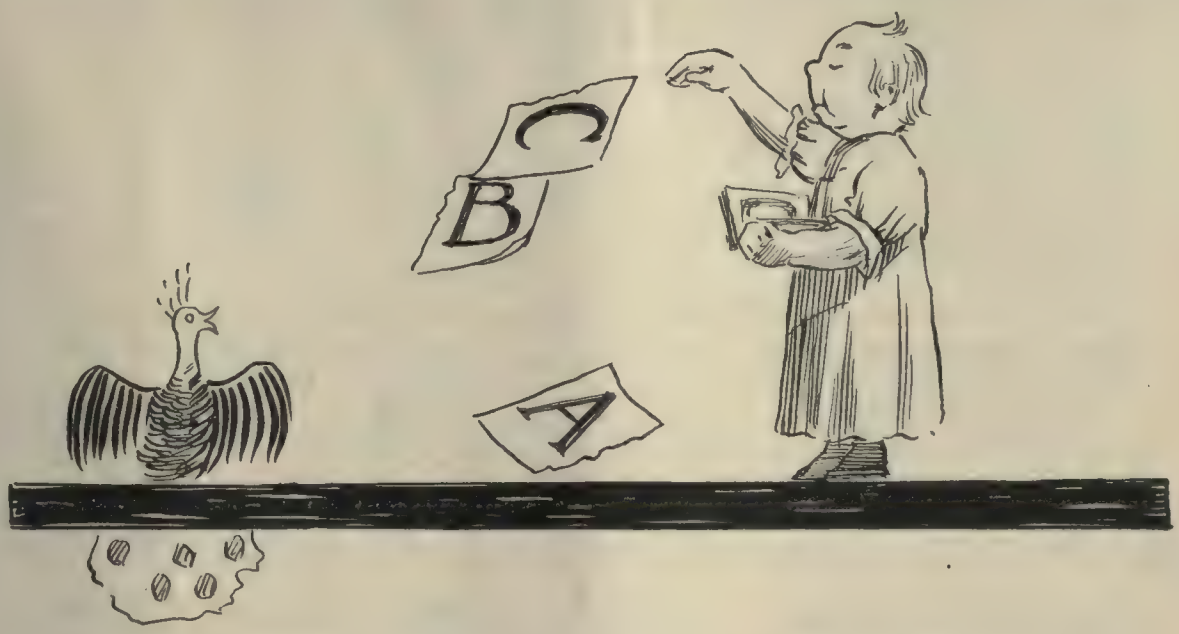
NEW PUBLICATIONS

Bridge Engineering. By J. A. L. Waddell, LL.D., consulting engineer. John Wiley & Sons, Inc., New York, N. Y. Two volumes. Vol. 1, 1064 pages; Vol. 2, 2177 pages. Cloth, $10 per set.

Dr. Waddell has put into this great work the cream of a lifetime of study and application in this special field. The treatment is, of course, most exhaustive. Practical suggestions regarding bridge design and construction are given, as well as charts and data for making cost estimates for bridges and structures of any sizes yet attained, or for approximating weights of metal in spans of unprecedented dimensions.

Safe Practices. Edwin R. Wright, editor. National Safety Council, Chicago, Ill.

The Council is reporting the results of its investigations on accident prevention summed up in monthly pamphlets. The first issue is on the subject of "Ladders," and it contains a brief review of the safety movement. The second is devoted to the subject of "Stairs and Stairways," and the third issue, just published, is entitled "Boiler Rooms." It is intended in this way to deal with various subjects separately and furnish information so that it can be preserved for reference. Details regarding the Council's activities can be obtained by application to W. H. Cameron, general manager.



Tear Out the A.B.C.

When the Irish peasantry tell about a real bright fellow, they say that on being born, he sneezed—proving he had a clear head—

And that when he was handed his first primer, he tore out the A.B.C. page as beneath his notice.

The number of early sneezers among electric railway men must be pretty high, judging by the clearheadedness they have shown in picking their brakes.

They have torn out the A.B.C. pages of the braking problem—the pages on clumsy, unreliable, hard-to-work brakes.

And sailed right into the study and acceptance of the **PEACOCK BRAKE.**

The only brake that embodies a quick-winding eccentric, an easy-turning roller bearing, an automatic stop and a balanced gear ratio.

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By **Charles F. Harding, S.B., E.E.**, Head of the School of Electrical Engineering, Professor of Electrical Engineering, Purdue University. Second edition. 416 *pages*, 6 *x* 9, *illustrated*. $3.00 *net*, *postpaid*.

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Towers
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Truss-pins
Insulators
Wires and cables
Signal systems for crossing protection
Trolley and feeder wire
Hangers
Ears
Fuses
Splicers
Strains
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Carbon brushes
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Clips
Joint and welding equipment
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Tie-rods
Chairs
Nuts, bolts and spikes
Lock-nuts
Rivets
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Wood preserving equipments
Track grinders
Grinding blocks
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and Superintendents of Equipment

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Axles and wheels
Gears and gear cases
Journal boxes
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Shop trucks—Air brakes—Jacks

of Electric Railway Journal

March 17, 1917

Practical advice in the shop is trouble saved on the road

That is one of the many benefits secured through our free Expert Service. Read the following partial report from one of our Experts:

"The manager understands of course that if the bearings are in poor condition, even the best oil will not prevent trouble, but he is greatly perturbed by the hot boxes on their interurban cars. I have made *suggestions* to obviate this and bring about permanent betterments to the service, as follows:

"First—The work of rebabbitting journal brasses should be done at the main shop and by one man, so as to place the blame for poor work that is being done.

"Second—That a more liberal supply of new brasses be placed in service, as there are a number of the old ones that must be scrapped.

"Third—That as soon as possible rebabbitting of journal brasses be discontinued and the brass be allowed to wear to a scrapping point and then taken out of service.

"Fourth—On account of the high speed and weight of cars, there should be a more liberal renewal of high grade packing, as a large proportion of the journal packing now in service is short strands, and while it would prove satisfactory in slower service, it is not conducive to good operation under the present conditions.

"Also, I have *requested* them to discontinue a practice which, no doubt, has been the cause of a part of the journal trouble, and if continued it will ruin the journals. I refer to a block of wood that has been made in the form of a journal brass and when they have a hot journal they remove the brass and put in the block of wood with a sheet of emery cloth on its face and then run the car. The result is another hot journal, as it is impossible to remove all the emery from the journal without removing the journal box. Furthermore, any irregularity in the journal face or diameter will be aggravated by such a proceeding and new journal brasses will have so little surface in contact with the journal that the weight per square inch is out of all proportion to what it should be. This was proven by an inspection of journal brasses that had only been in service twenty-four hours. The journal box dust guards have not had the attention they deserve, and there are a number of journals without them."

Little things? Yes. But it was the viewpoint of a practical outside man that discovered them and realized their important effect on good service. That is what our Experts will do for you—point out the little faults, far reaching in their unfavorable effect on your service, that you have lived so close to that they have been unnoticed. And note that our man made only SUGGESTIONS and REQUESTS of the railway officials—no commands, no arbitrary demand that such and such a thing be done—it is up to the officials to accept or reject our recommendations. But the wide-awake railroad man is looking for practical advice. And we are equipped to give it to him.

Galena-Signal Oil Co.

Franklin, Pa.

1913 — "Tool Steel" gears specified on 240 new motors

1914 — " " " " 340 " "

1916 — " " " " 400 " "

use of the latter suggested.

United Railways & Electric Company, Baltimore, Md., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 9 as purchasing one hundred double-truck, semi-convertible, four-motor pay-within cars, announces that contracts have been awarded for the following equipment:

Car bodies and trucks	J. G. Brill Company
Motors	General Electric Company
Air brakes	Westinghouse Traction Brake Company
Seats	J. G. Brill Company
Signs	Hunter Illuminating Car Sign Company
Registers	International Register Company
Fare boxes	Johnson Fare Box Company
Gears and pinions	Tool Steel Gear & Pinion Company
Electric heaters	Consolidated Car Heating Company
Wheelguards	Wendell & MacDuffie Company
Car wheels	National Car Wheel Company
Ackley brakes	National Brake Company
Inspection	R. W. Hunt & Company

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an ord... the Boston Elevated Railway for 5000 trolley

And they have carefully tested other grades!!

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Easy to Handle and Handles the Work Easily

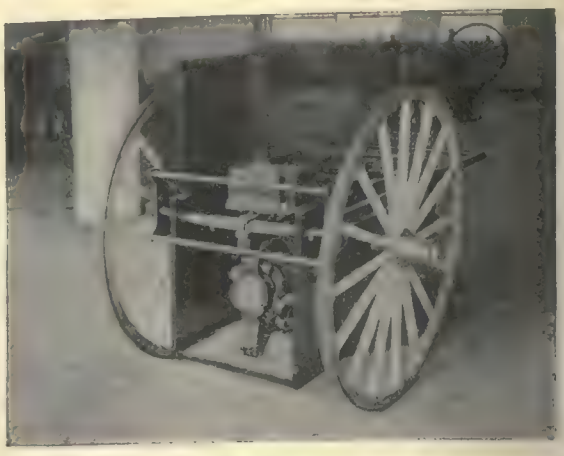
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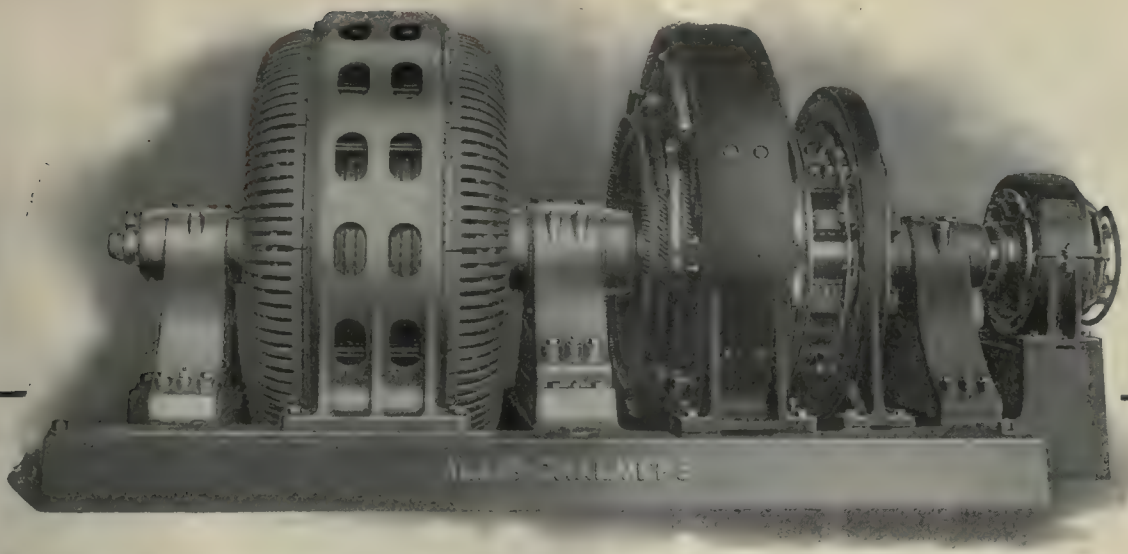
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Protection where high voltage wires interlace requires extra defensive measures

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One of fifteen new

Jewett Steel Cars

Ordered by the Northern Ohio Traction & Light Co.

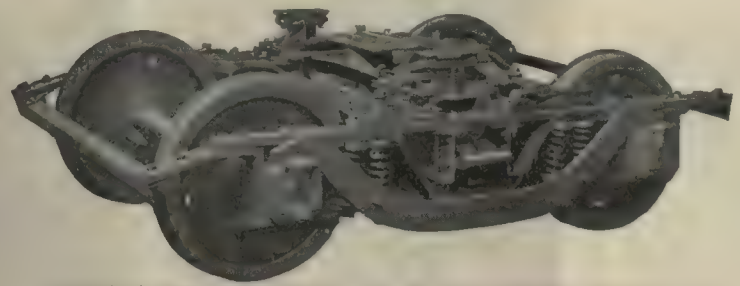
Seven of them have baggage compartments—eight have smoking compartments. All have spacious white enameled saloons with running water, etc. Pressed steel posts—steel plates throughout—steel grained mahogany interior finish—chanarch and composition flooring with battleship linoleum in aisles—these are some of the details of these "cars of character."

Let us bid on your specifications.

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Please Your Patrons

A comfortable journey in an easy-riding car is a good asset for any electric interurban railway. Satisfied riders will continue to patronize the line, and will advertise its good features.



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Let Baldwin trucks do their part in soliciting patronage for your road. They are easy riding by reason of the method of spring support used, while their strong, rigid frame construction prevents noise and rattle when running over frogs and switches, and holds the truck "square" in severe service.

Investigate the good points of the Baldwin class "A" before selecting the truck equipment for your new interurban cars.

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Railway Feeders

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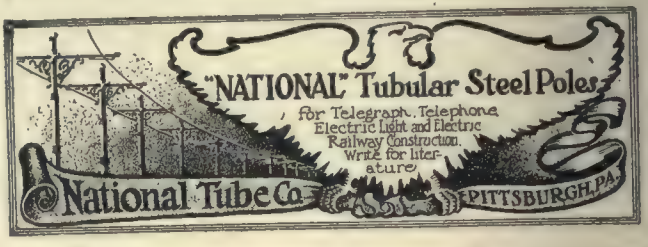
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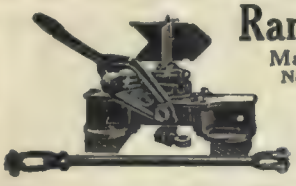
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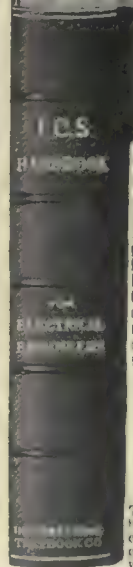
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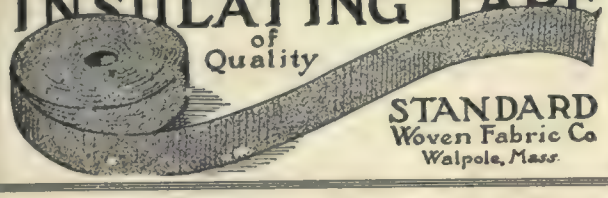
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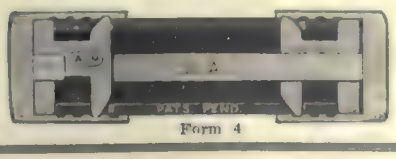
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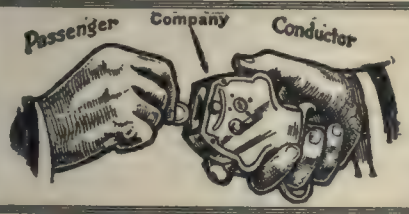
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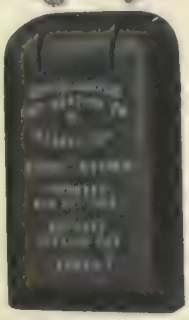
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1000 K. W. 575 Volt Direct Connected Generating Set

1—1000 KW. General Electric type M.P. form H, 575 volt, 1739 amps. 14 pole generator direct connected to 24 and 43 x 42″ McIntosh & Seymour cross compound vertical engine, speed 120 r.p.m.

200 Kilowatt 60 Cycle Rotary Converters

2—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 r.p.m., with starting motors, also transformers if desired.

150 Kilowatt 60 Cycle Rotary Converters

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

25 Cycle Rotary Converters

2—200 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.
2—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

Transformers

2—375 KVA. General Electric type, 60 cy., 9600 volts prim., 575 v. secy.
4—100 KW. Westinghouse transformers, oil insulated, single ph., 60 cy., 2300 v. primary, 360 v. secondary.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. primary, 430/362 v. secondary.
6—75 KW. General Electric, 13,200-6600 volts, 385 volts sec. Transformers.

Railway Motor

1—75 to 90 HP. Westinghouse No. 112 Railway Motor, newly rewound, practically new.

IMMEDIATE DELIVERY

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OPEN and CLOSED
MOTOR and TRAIL
Write for Price and Full Particulars to

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Commonwealth Bldg. Philadelphia, Pa.

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FOR ALL THE STANDARD
STREET RAILWAY MOTORS
GET OUR PRICE WE CAN SAVE YOU MONEY
America's Greatest Repair Works
CLEVELAND ARMATURE WORKS, Cleveland, O.

Try Journal "Positions Wanted" columns for high grade positions.

Try Journal "Positions Vacant" columns for high grade assistants.

Get your Wants into the Searchlight

SEARCHLIGHT SECTION

FOR SALE

Fare Boxes for Sale

100 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

Used Railway Motors

Two Westinghouse, No. 12A, 30 H.P., 500 volt, 550 R.P.M., complete with axle brackets and pinions. Bargain. The Electric Railway Improvement Co., Cleveland, Ohio.

Equipment for Sale

600 Kw. direct connected a.c. unit, consisting of one Harrisburg cross compound condensing engine; 4 valve; diam. cylinders, 24" and 46"; stroke, 27"; r.p.m., 120; i.h.p., 800; diam. steam pipe, 10"; exhaust, 20"; steam pressure, 145 lbs.; cut-off, 0.29; vacuum, 26".

Generator G. E., type A. T. B., No. 71078, class 60-600-B-120; form E; volts, 11,000; speed, 120 r.p.m.; amperes, 32.

Control panel and oil switch included.

Prompt shipment can be made.

The American Railways Company, Witherspoon Building, Philadelphia, Pa.

INTERURBAN CARS

3—51 ft. Combination Passenger & Baggage. (4 ft. 8½" gage)
Seating Capacity 45.
Trucks Brill No. 27.
4 Motors Westinghouse 310. H. L. Control.

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Steel Underframe.
Trucks Brill No. 1 M. C. B.

All first-class condition.
Immediate delivery.
Write, wire, or 'phone

WALTER A. ZELNICKER SUPPLY COMPANY
ZELNICKER
St. Louis

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300 Tons-60 lb.

PRACTICALLY NEW

A. R. A. Section Series "A." Laid but never used. 4½" high with angles.

Don't overlook this opportunity to secure New Rails at less than mill cost and for immediate shipment.

Also large quantities other sections.

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MISCELLANEOUS

Accounts Wanted

Being about to organize a Company in the General Railway Supply Business, I would be glad to hear from any one having articles of merit, or specialties that they desire handled or brought to the attention of Steam or Electric Railroads. I only desire accounts on a commission basis and with exclusive, specified territory. Several persons will be associated with me in this Company who have a general acquaintance among the Railroads, both Steam and Electric, throughout the country. Harry T. Bigelow, 934 Peoples Gas Bldg., Chicago, Ill.

POSITIONS WANTED

AVAILABLE for busy executive: Assistant with unusual qualifications and experience. College graduate; Member of Bar. Six years in various executive offices of large railway and lighting company. Now law clerk for legal and claim departments. Can take charge of legal and claim work or other detail. Ability backed by judgment and experience. Box 1223, Elec. Ry. Jour.

ELECTRICAL engineer, married, 34, 7 years' experience; overhead construction and maintenance; high tension, subway, bonding, electrolysis, signals. Wants position as distribution engineer or superintendent of overhead. References including present employers. Box 1354, Elec. Ry. Jour.

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ENGINEER—Manager, 24 years' experience in the construction and operation of electric railway and lighting properties. Experienced in all branches, more especially overhead line construction and power station and sub-station construction, equipment and operation. Now employed, but desires change. Will go anywhere. Box 1343, Elec. Ry. Jour.

Your Advancement

is largely in
your own hands—it is
doubtful if any
one else is worrying over it

Better positions are constantly being secured through small advertisements in the "Positions Wanted" Columns of *Electric Railway Journal.*

60 cents for 20 words

POSITIONS WANTED

EXPERIENCED manager of public utilities, light and power, city and interurban railway and gas. Open for engagement. Fine record. Best references. Box 1351, Elec. Ry. Jour.

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FINANCIAL officer having number of years' experience with financial and accounting departments of both public service corporations and industrial plants, desires change, and now open for offer. Experience covers United States and Canada. Best of reasons confidentially given for desiring change. Address Box 1361, Elec. Ry. Jour.

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PURCHASING agent, thoroughly experienced and reliable, desires to make change. Ten years present position with large corporation in charge purchasing and stores; close buyer; student of market tendencies; familiar with "safety first" work and managerial problems. Position as assistant general manager preferred; salary $4,000 to $6,000. Box 1360, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

YOUNG man, age 26, single, five years' experience with purchasing agent of a company controlling steam and electric railways, also gas and electric light companies, desires position as assistant purchasing agent. Box 1362, Elec. Ry. Jour.

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ENGINEER wanted to act as chief engineer in large central station power house in an Atlantic seaboard city. Must be qualified to take charge of an 80,000 k.w. plant and experienced in handling Curtiss turbines, Jett and surface condensers, and Taylor stokers. Applicant must have experience in large central station plants. State age, experience and salary expected. If employed, give name of company and reason for changing. All replies strictly confidential. Box 1355, Elec. Ry. Jour.

FIRST class armature winder for mine work wanted. Apply Box 1359, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

WANTED—A carbarn foreman for eighteen car barn. Massachusetts. Pays twenty-one dollars. State full qualifications with references. Box 1358, Elec. Ry. Jour.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.
If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will probably furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device Co.

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Railway Improvement Co.

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National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co

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Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

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Columbia M. W. & M. I. Co.

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International Register Co., The

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National City Co

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Electric Storage Battery Co.

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Baldwin Locomotive Works.
Holden & White.

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
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Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

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Westinghouse Elec. & M. Co.

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Babcock & Wilcox Co.

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Ohio Brass Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

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Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

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Electric Service Supplies Co.
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Jeandron, W. J.
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Westinghouse Elec. & M. Co.

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Dixon Crucible Co., Jos.

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Electric Service Supplies Co.

Bunkers, Coal.
Beaumont Co., R. H.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

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Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co. John.
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Electric Equipment Co.
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Consolidated Car-Heating Co.

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Eureka Co.
Frankel Connector Co.

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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

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Amer. Brake Shoe & Fdy. Co.
Bemis Car Truck Co.
Long Co., E. G.
St. Louis Car Co.

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Electric Service Supplies Co.
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Horne Mfg. Co.
Kerschner Co. Inc. W. R.
Long Co., E. G.
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General Electric Co.
Lincoln Electric Co.

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Little, Inc., Arthur D.

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Clamps and Connectors for Wires and Cables.
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Ohio Brass Co.
Van Dorn & Dutton Co

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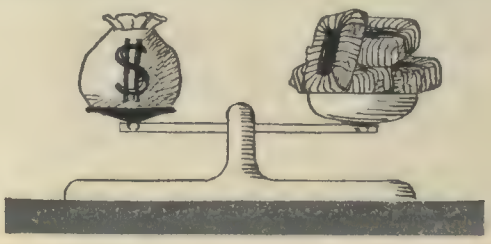
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We will then rewind the wire into new coils of precisely the same characteristics as the old ones.

This is much cheaper for you than buying new coils, for the only charge we make is a very small one for the actual insulation used.

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Oxweld Acetylene Co.
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Kinnear Mfg. Co.

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American Steel & Wire Co.
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Consolidated Car Fender Co.
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Westinghouse Elec. & M. Co.

Fibre Insulation.
U. S. Metal & Mfg. Co.

Fibre Tubing.
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

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American Mason Safety Tread Co.

Forgings.
Eureka Co.
Standard Steel Works Co.

Frogs, Track. (See Track Work.)

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D & W Fuse Co.
Daum, A. F.
General Electric Co.
Westinghouse Elec. & M. Co.

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Columbia M. W. & M. I. Co.
General Electric Co.

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U. S. Metal & Mfg. Co.
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Westinghouse Elec. & Mfg. Co.

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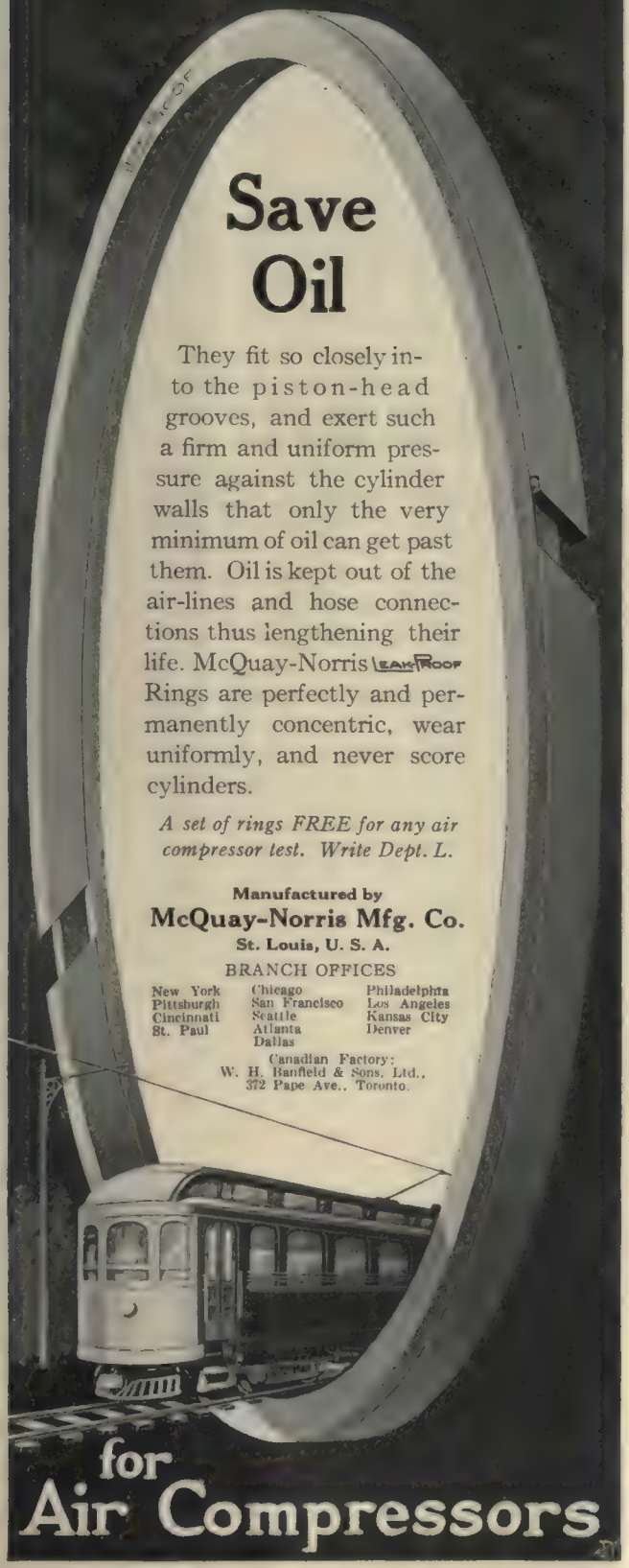
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You would think off-hand that the Ayah was doomed to a lonesome existence, but that is because you forget that the eye of the Bombay cop is unblinded by caste.

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Printing begins on Tuesday of each week.
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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Titanium-Treated Rails in use at Fall River, Mass.

TITANIUM-TREATED RAIL in the Bay State

—on the lines of the Bay State Street Railway—have been for some time installed in Fall River and in Methuen, Mass.

In all, 300 tons of 9-in. girder rail and 50 tons of 9-in. guard rail have been installed—both types having received the usual cleansing treatment with 0.1% titanium in the form of Ferro-Carbon-Titanium.

Though these rails cost a little more per ton than ordinary untreated carbon rails, actual service in a wide variety of installations all over the country proves them to have about 40% longer life.

Write today for descriptive literature.

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

General Office and Works:
Niagara Falls, N. Y.

TPC
Reg. U. S. Pat. Off.
TRADE MARK.

Processes and Products Patented

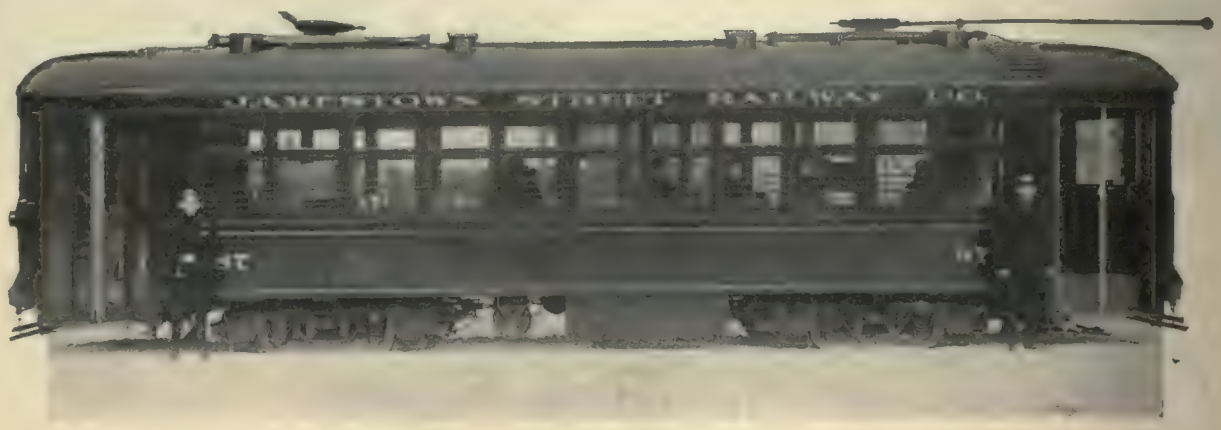
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Chicago Office: Peoples Gas Building

New York Office: 15 Wall Street

AGENTS:

Pacific Coast: ECCLES & SMITH CO., Los Angeles, San Francisco, Portland
Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England

City Car No. 87



It is one of ten just placed in service by the Jamestown Street Railway and is a fine example of a high-class car for a town of moderate size.

It weighs 17 tons completely equipped, 5 tons less than earlier Jamestown cars.

It seats forty-four passengers, but will readily accommodate one hundred and twenty-five.

It is operated at a schedule speed of 12 m.p.h.

It will make less temporary or permanent demand upon the power station than any other car of like weight in Jamestown because it is equipped with

GURNEY Radio-Thrust Ball Bearings

GURNEY BALL BEARING CO.

Conrad Patent Licensee

Chicago, Ill. JAMESTOWN, N. Y. New York City

CENTER-ENTRANCE INTERURBAN CARS

That the center-entrance car has a place in interurban as well as in city service has been pretty well demonstrated during the last couple of years.

Most of the installations have been in the central west altho the south has been well represented. Among some other notable places is the region centering at Hazelton, Pa., where ten steel center-entrance cars recently were put into service by the Lehigh Traction Company.

This interurban system, in common with the others which are equipped with center-entrance cars, has a large number of stops per mile on the lines thus equipped and therefore the importance of increasing the safety and expediting the movement of passengers in boarding and alighting is obvious.

And it is plain that the conductor at the center of a long car can watch passengers going in and out, control their movements, collect fares and operate the doors to good advantage.

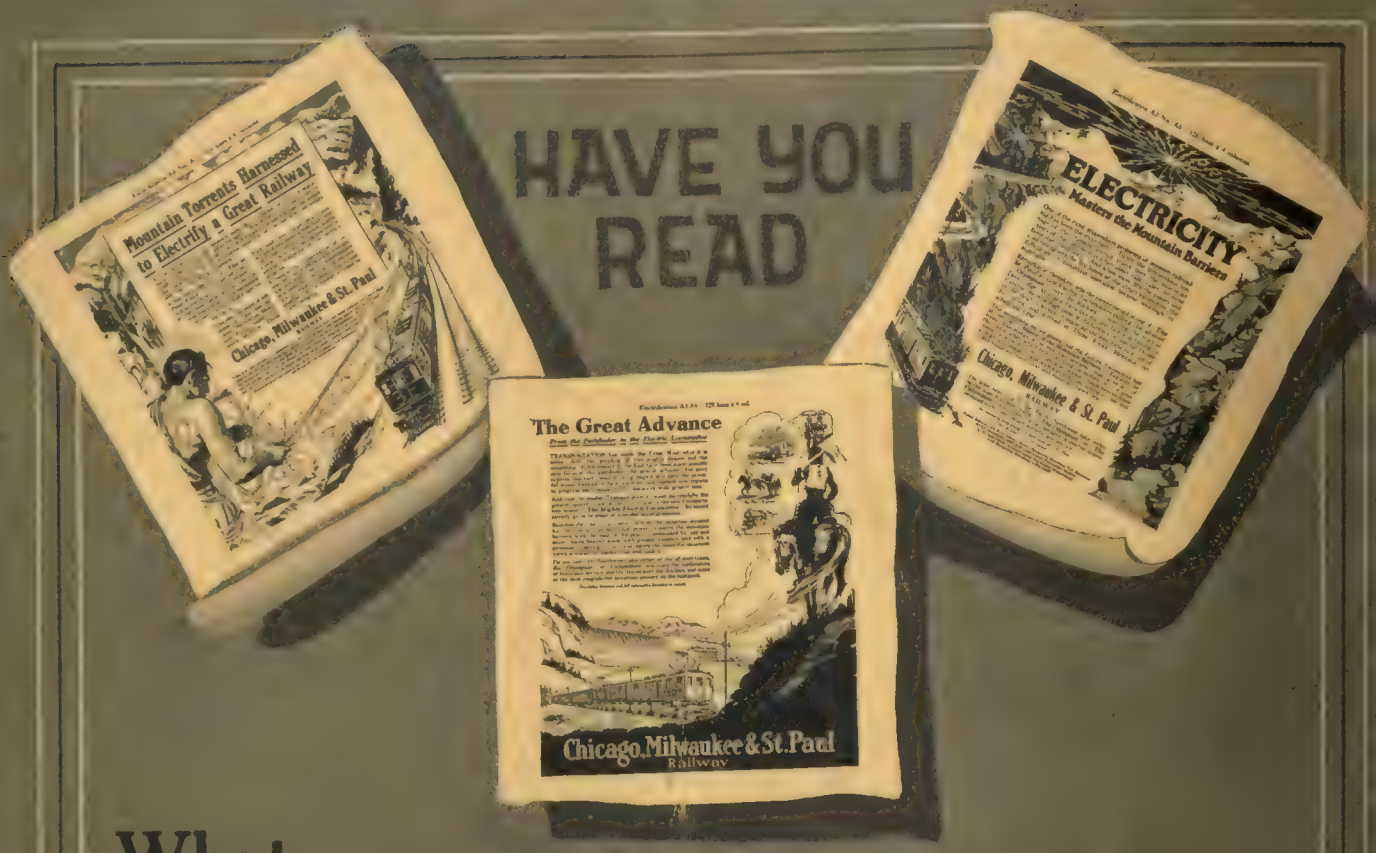
Modern steel construction has done away with the heavy framing formerly necessary to compensate for interrupting the side members and there is now practically no difference in weight.

By the way, the Lehigh Traction Company's cars are equipped with Brill "Renitent" Posts.



"Look it up in Brill Magazine"

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR CO., CLEVELAND, OHIO
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.
CIE J. G. BRILL, 49 Rue des Mathurins, PARIS



What the Chicago, Milwaukee & St. Paul

Railway says about the General Electric 3,000-volt d. c. locomotives that haul its star passenger trains, the "Olympian" and the "Columbian," over the continental divide?

Here are a few of the advertisements that the progressive "St. Paul" has placed in thousands of newspapers and other publications throughout the United States.

The obvious stimulus to passenger traffic is only one of the significant results of this project which is the greatest electrification in the world.

General Electric Company

General Office
Schenectady, N. Y.

Sales Offices
in all large cities

635⁹



Report of Mid-Year Convention

ELECTRIC RAILWAY JOURNAL

New York, February 17, 1917 McGraw Publishing Co. Inc. Vol. 49, No. 7 10c a copy

Your Road Has Hundreds of Profitable Uses For The

Prest-O-Lite PROCESS

Broken top frame of heavy car truck ready for welding. Broken ends were drawn together by twisted chain and held in place by screw jack.





Portable oxy-acetylene welding outfit

Illustration below shows the frame repaired by oxy-acetylene welding. Actual welding by the Prest-O-Lite Process required but 42 minutes.



THE permanent repair, quickly and inexpensively made on this broken truck frame, is typical of the substantial savings possible in every electric railway shop by oxy-acetylene welding. Dismantling and welding this break in a forge would have cost at least $15.00. With a portable oxy-acetylene welding outfit, the job was *prepared and welded* in 2 hours and 12 minutes at a cost of only $1.50—a clean-cut saving of $13.50 *on just one repair.*

Not only is the oxy-acetylene process a time-saver and money-saver in repairs and reclamation work, but it effects large savings in the manufacture of new equipment of all kinds for electric railways.

Let us help you find the place where oxy-acetylene welding will save for you. Interesting information and data gladly sent on request.

The Prest-O-Lite Co., Inc. 805 Speedway Indianapolis, Ind.

Westinghouse

No. 514 BABY MOTOR

For Low Floor Light Weight Cars



The "Baby Motor" was originally developed and designed for the equipment of the low-floor, center-entrance cars, with 24-inch wheels first introduced several years ago by the Pittsburgh Railways Co.

The performance of this type of car and the "Baby Motors" was so successful from the start that they became exceptionally popular and have been adopted as standard on many roads. The Pittsburgh Railways Co. ordered over 700 No. 514 Motors during 1916.

Leaflet No. 3951 gives particulars of No. 514 Railway Motors.

Westinghouse Electric & Mfg. Company

East Pittsburgh, Pa.

Sales Offices in all Large American Cities

567

W
WESTINGHOUSE ELECTRIC



ELECTRIC RAILWAY JOURNAL

VOLUME XLIX, No. 7 NEW YORK, FEBRUARY 17, 1917 PAGES 279 TO 332

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Salesmanship and Its Effect on Electric Railways

Companies should really sell jobs to their employees and train them as salesmen of personal service. Robert Frothingham tells why railways must appeal to the public's self-interest to enlist its sympathy..Page 289

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The Westinghouse Inspector-Specialist saw at a glance what was wrong and pointed it out, saying: "The piping is wrong. They did not follow the blue print. The main reservoir pipe is connected to the brake cylinder port of the triple valve. Correct that error and put the car on it's run."



The Message from the Car Barn

"Yes, Mr. President, thanks to that Westinghouse Inspector-Specialist, we have all of those ten new cars in service earning nickels. We're handling a record holiday crowd and cleaning up corners at every stop. We made a slip-up in the piping. He set us right—came 500 miles on our wire at his own expense—made no kick, even though the fault was ours."



Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

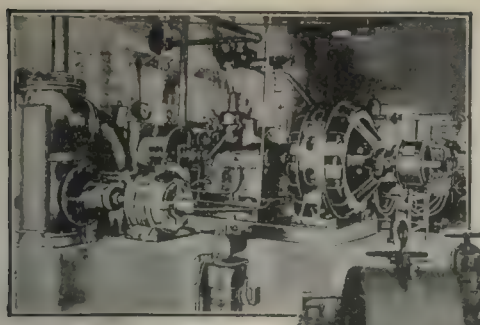
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Westinghouse Building

CHICAGO:
Railway Exchange Building

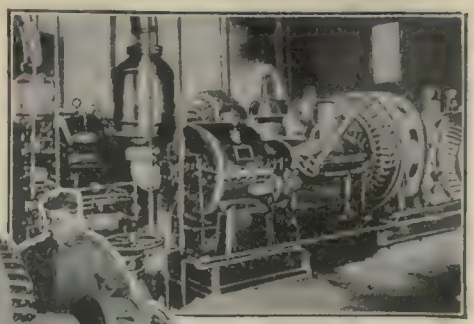
TRADE MARK

NEW YORK:
City Investing Building

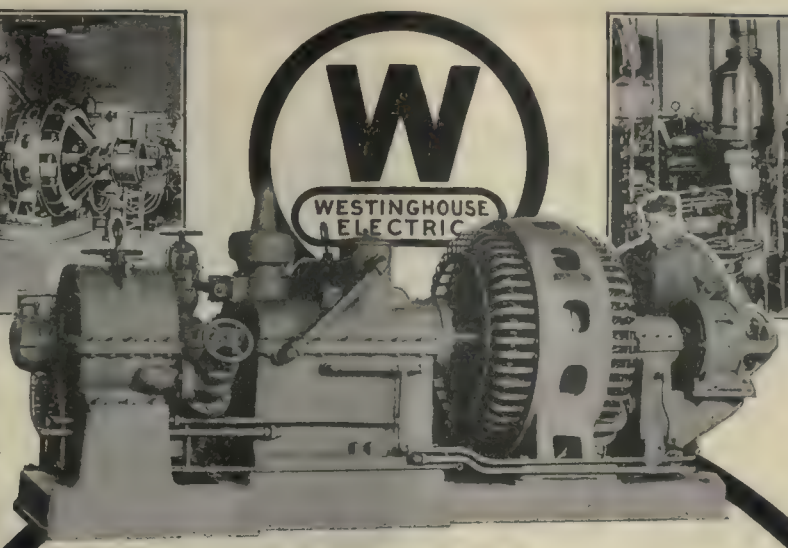
ST. LOUIS:
Boatmen's Bank Building



150 kw. Westinghouse Geared Unit Exhausting into Condenser. Dowagiac (Mich.) Municipal Plant.



Two 300 kw. Westinghouse Geared Units. Hoopeston (Ill.) Gas & Electric Co.



Remarkable Economy at Fractional Loads

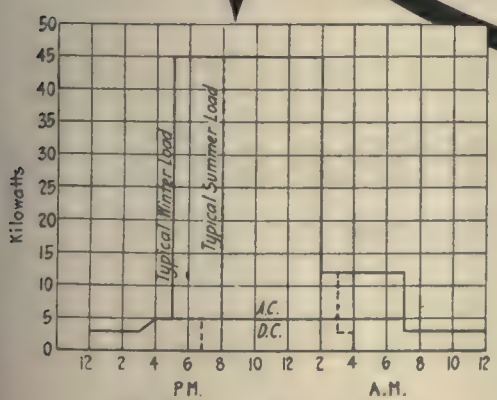
The Westinghouse Geared Turbo-Generator is a Necessity to the Plant with a Poor Load Factor.

The 150 kw. Westinghouse Geared Turbo-Generator at the City of Dowagiac, Mich., operates at less than one-third its rated capacity. The economy of this unit at fractional loads is so good that it was practical for this municipality to anticipate future requirements by installing now, a unit that will handle over three times the present load.

During the summer canning season, the two 300 kw. Westinghouse Geared Units in the Hoopeston plant operate between ¾ and full load, and during the winter between ¼ and ½ load. The seasonal variations, as well as the extreme fluctuations in the daily load, are handled nicely by these Geared Units, which secure economies at the lighter loads practically as good as those at full-load capacity.

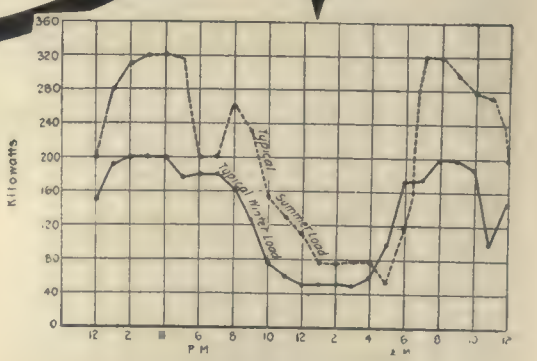
Write for Leaflets 3869 and 3870.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.



Typical Summer and Winter Loads carried by the Dowagiac plant.

(See the July 8, 1916 issue of the ELECTRICAL WORLD for a description of these plants and reasons for installing Westinghouse equipment.)



Typical Summer and Winter Loads carried by the Hoopeston, (Ill.) plant.



Building Durability into O-B Ear



Sectional View of O-B Bronze Ear installed on round wire

From ingot to stockbin every precaution is employed to assure the final quality of O-B Trolley Ears.

Only pure virgin metal is used and it is mixed according to a time-tried formula.

In the machining and foundry processes experienced, well-directed workmen do their part.

Visual inspection of each ear is followed by a series of abusive tests of representative ears picked at random from each lot.

These ears must be able to survive punishment which would make the worst service conditions seem mild.

Those are some of the reasons why O-B Bronze Ears stand up unflinchingly on the line.

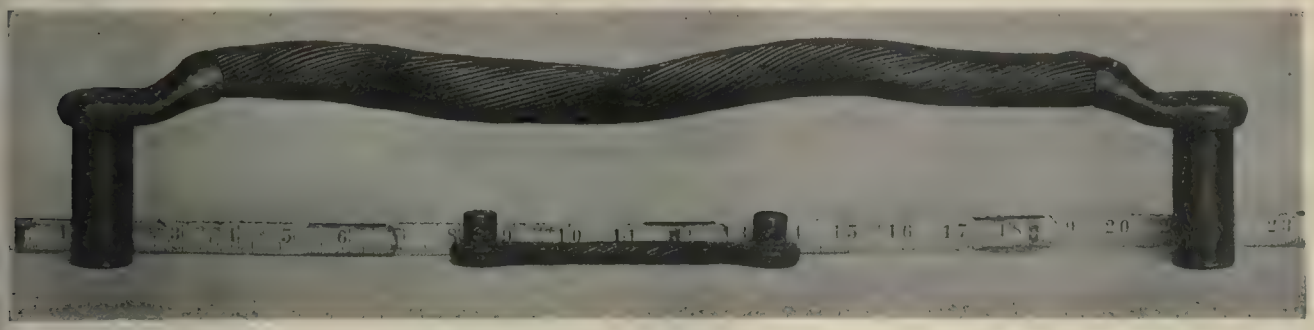
Then, too, the design has something to do with it.

For so carefully has the metal been distributed that there is a smooth passage for the wheel, with minimum arcing, yet with a generous amount of bronze in the lips which resist wear indefinitely.

O-B Ears are made in sizes and styles which completely cover the field. ***Prompt shipment from stock.***

The Ohio Brass Co.

Mansfield, Ohio



An O-B Bond for Every Need

Some idea of the versatility of O-B Compressed Terminal Bonds is conveyed in the illustration.

The smaller is for light rail and is 2-0 capacity with ½-inch diameter terminal.

The larger is for 150-lb. Third Rail and is 750,000 C.M. capacity with 1⅛-inch diameter terminal, 2½ inches long.

Between these two extremes are O-B Bonds that will meet your conditions, no matter how unusual.

O-B Bonds have soft, ductile terminals that flow easily during installation and make an intimate low-resistance contact.

Perhaps it is their unvarying quality which has led to their widespread use.

O-B Engineers will gladly share their knowledge of bonding with you.

Address

The Ohio Brass Co.

Mansfield, Ohio



Phono-Electric

Collecting 300 Amperes at 11000 volts—since 1908

is not proving a difficult task on the New Haven electrification.

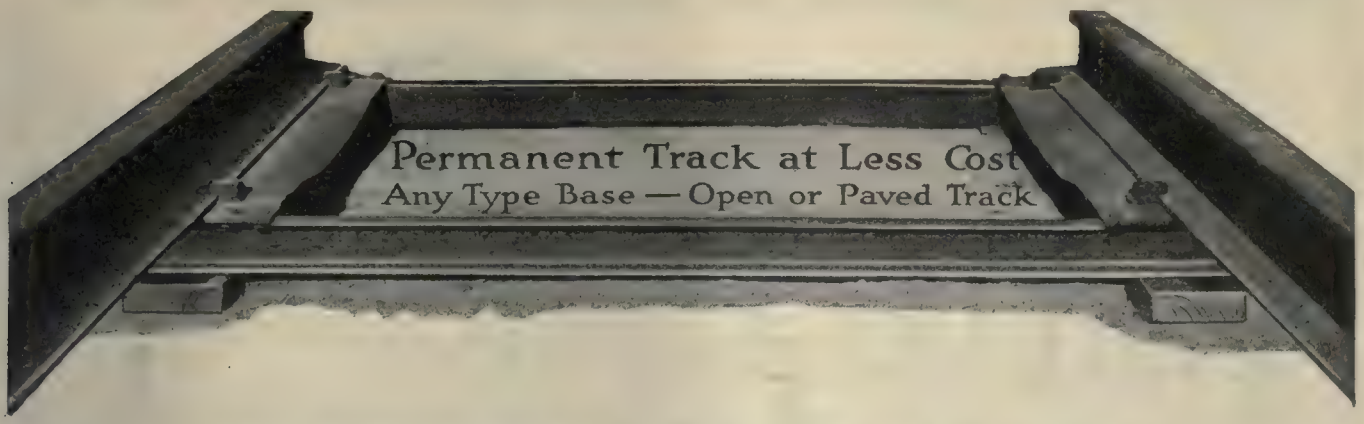
Few electrified roads carry so many tons per mile and give so much care to the question of absolute reliability in its distribution system.

That's why more than 80 per cent of the contact wire between New York and Stamford—a four-track line—is Phono-Electric

—the wire that wears long and **evenly** despite the service demands placed upon it in operating heavy passenger and freight trains at high speeds and high voltages.

Bridgeport Brass Company

Bridgeport Connecticut



INTERNATIONAL
STEEL TWIN TIES
do not require experienced labor

Follow the simple instructions and you can't lay it wrong.

The saving in labor costs is one of the big advantages of International Steel Twin Ties. And now that labor is such a problem it becomes imperative to reduce labor requirements wherever possible.

International Steel Twin Ties require 40% less excavating, 60% less blocking, 50% less labor in fastening, less pavement to be replaced, less concrete, etc.—savings all along the line.

These are not claims, but are the experience of all users of Steel Twin Ties.

Let us submit comparative estimate for your job.

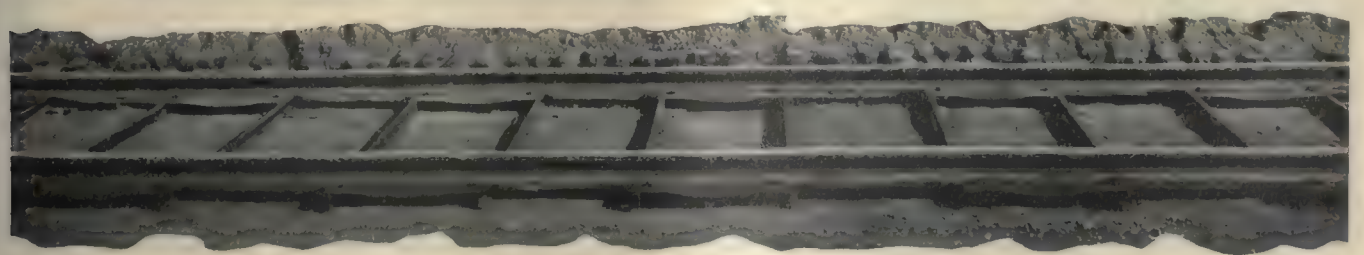
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

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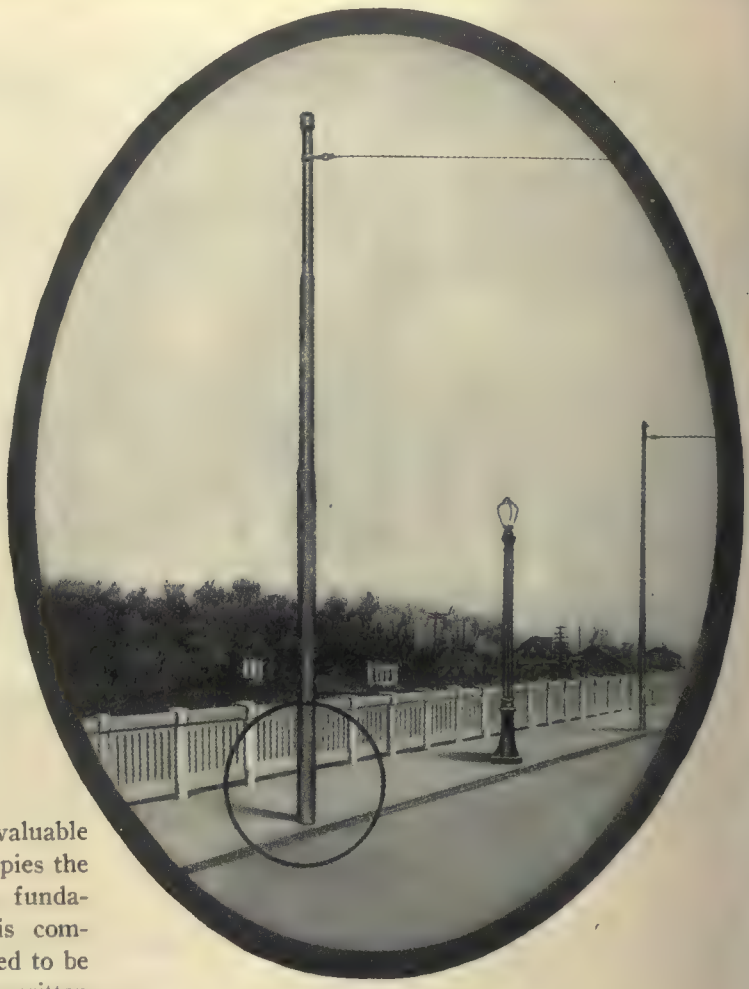
The ELRECO

Tubular Pole

is the Safest

and

Least Cumbersome



In cities where sidewalk space is valuable there is demand for the pole that occupies the smallest ground area. When this fundamental—the smallest ground area—is compounded by many other points conceded to be meritorious, you have the specifications written for Elreco Tubular Steel Poles.

Children cannot climb them.

Teamsters cannot readily use them for a hitching post.

They offer slight opportunity for hubs of vehicles to engage them in passing.

They offer unexcelled ease in painting.

They surpass every other form and shape of pole in uniformity and in their ability to withstand strains in all directions.

An Elreco Tubular Pole occupies but 34½ sq. in. at the ground line. For your own edification, compare these figures with those of poles other than Tubular.

These are but a few of the many reasons why Elreco Poles have been used so extensively by leading street railways throughout the world. In theory as well as in practice, these poles are conceded to be rightly designed. Likewise they are the safest and the most serviceable.

Let us have your inquiries for your present and future requirements.

ELRECO Tubular Poles

Combine

Lowest Cost
Lightest Weight
Least Maintenance
Greatest Adaptability

Electric Railway Equipment Co.

Cincinnati, Ohio

New York: 30 Church St.

Los Angeles Railways Standardized on Golden Glow Headlights



—after officials of that Company had carefully considered all other types of Headlights on the market



Los Angeles is wide awake to the advantages of "Golden Glow" Headlights. About one year and a half ago they purchased 18 "Golden Glows," used them on their cars, put them to every test and carefully compared them with other types on the market.

And now they have purchased 350 additional "Golden Glow" Headlights, because they have best stood the tests and offered their many exclusive advantages.

Wouldn't it be well for you, too, to consider "Golden Glow?"

Ask us to demonstrate them on **your cars.**

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.



Lines of the Spokane and Inland Empire Railroad Co., Coeur d'Alene Division, at Liberty Lake Junction. The poles are 40 ft. 7 in. top, WESTERN RED CEDAR POLES, installed in 1903; spaced approximately 100 ft.

"The Universal Poles for Universal Service"

Western Red Cedar Poles

WESTERN RED CEDAR POLES are the Universal Poles for Universal Service because they meet all of the requirements for any type of pole-line construction in any part of America.

In every part of the country are lines of strong, straight, beautiful WESTERN RED CEDAR POLES which are *in good condition* after rendering 14, 15, 16 and 17 years of hard service.

The more you examine the various types of construction employed by leading electrical engineers in all parts of the country, the more you will be convinced of the rapidly increasing use of WESTERN RED CEDAR POLES in all sections by concerns which make a real study of pole-line problems.

Look into this before you place your next order for poles. Write us.

The Most Beautiful of All Poles
They Stand the Strain
Light in Weight—Minimum Cost

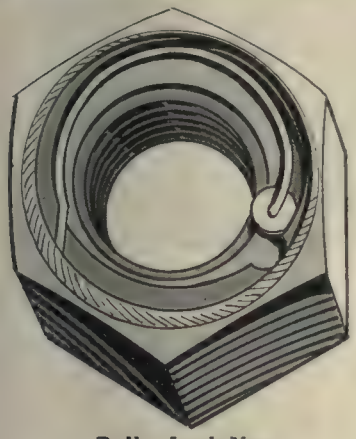
Western Red Cedar Association

Peyton Building Spokane, Washington

ROLLER LOCK NUTS

ON TRACKS AND CARS





Roller Lock Nut
with Steel Cover Removed

Vibration Is the Poison of Track and Cars—We Remove This Poison by Our

Roller Lock Nut

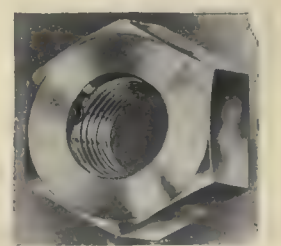
Because it is the

ONLY Really Self-Tightening Lock Nut
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ONLY Re-usable and Absolutely Locked Nut
ONLY Combination Lock and Plain Nut, size of a plain nut
ONLY Lock Nut that does not injure bolts in use or removal

We Cut Cost in Half—Let Us Prove It

OVER 120 ELECTRIC LINES ARE NOW TESTING

Roller Lock Nut Company, Inc., 61 Broadway, New York City



Commercial Roller Lock
Nut with Steel Cover



Superiority Proven by Service

When we assert that Hale and Kilburn Seats are the most durable, as well as the most comfortable car seats available, we do so out of the fullness of our experience.

The installation pictured is but one of many on electric railways throughout the world.

These 15-year-old seats could not have retained their shape under the hard usage of street railway service if they had not been made right—from the Springs to the Rattan Covering.

Hale and Kilburn Seating has behind it more than a generation of conscientious design and construction. Examples like this prove it!

WALKOVER

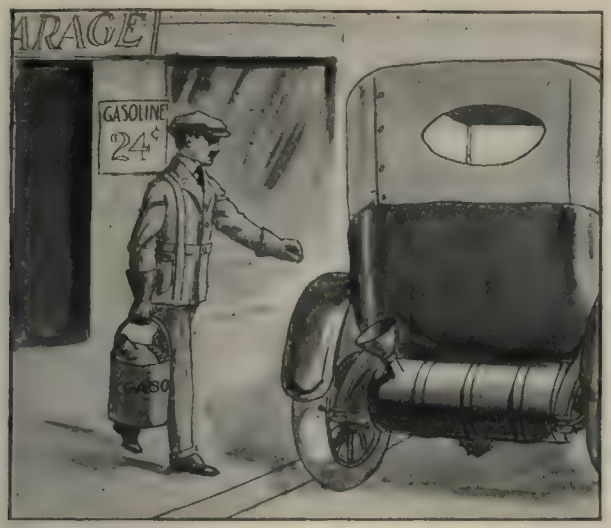
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Hale and Kilburn Co.

Philadelphia Washington New York Atlanta Chicago San Francisco

WALKOVER

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Gasoline or Electricity

How much per car mile?



In this day of automobile ascendance the "miles per gallon" of gasoline is a prominent feature in automobile selling and automobile operation.

If electricity could be dealt out in "cans" by the gallon, as is gasoline, it is safe to say the motorman, like the chauffeur, would be estimated as a driver in accord with the amount of "juice" he used to operate his car over a given run. As the amount used decreased, the rated efficiency of the driver would increase.

Now this is just what the Economy Meter accomplishes. It measures the "juice" used as positively as "gasoline" is measured for an automobile. It tells how much energy is used in the operation of each car for any period or run.

Economy Meters and the Economy Campaign will interest your motormen in K.W.H. per car mile just as the auto owner is interested in miles per gallon of gas.

ECONOMY
BUILT LIKE A WATCH
METERS

Sangamo Electric Company
Springfield, Illinois

Specialists in Meters for Every Electrical Need

Even Copper Zone Fares Are Provided For



FARE RECORDER MOUNTED ON CENTER BULKHEAD OF INTERURBAN CAR

If you are planning to get a fairer return from your passengers by working out a copper zone system of fare charges and collection, you will find that an instrument ideal for this purpose has been developed. This instrument is the

BONHAM TRAFFIC RECORDER

which is efficient for keeping accurate records of every class of traffic. It shows you between what points each passenger travels, what fare he paid and how many miles he rode. By means of the record furnished the auditing department gets accurate train earnings and accurate earnings per passenger mile.

The Bonham Traffic Recorder is not an experiment. It is a fact. Let us give you details of what it is accomplishing in every-day service.

THE Bonham Traffic Recorder produces rapidly, simply and accurately a permanent record showing:—

The "on" and "off" points of each passenger.

The mileage traveled by each passenger.

The classification of each fare and the amount of each cash fare.

The date, train number and division.

The total passengers.

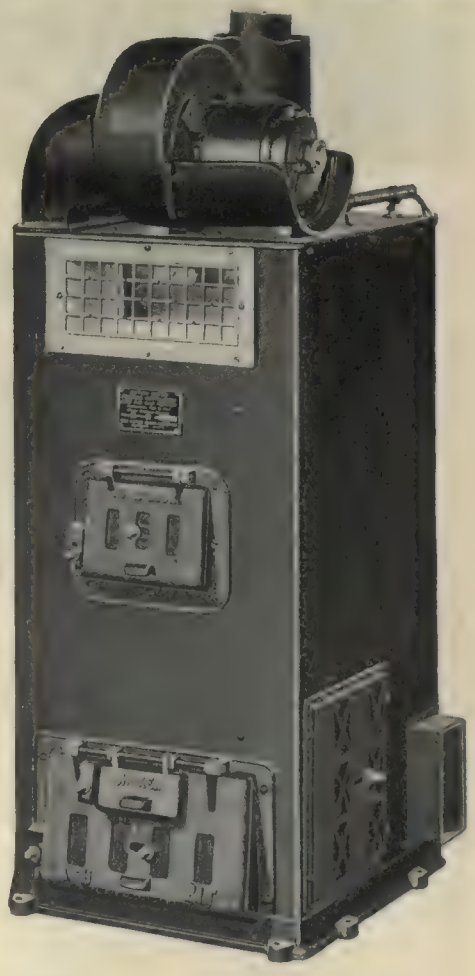
The total cash passengers.

THE BONHAM RECORDER CO.

Hamilton, Ohio, U. S. A.



PETER SMITH HEATERS



Would Have Met Moses Cleveland's Favor

Moses Cleveland certainly showed good judgment in picking that spot on Lake Erie for what has become one of the finest cities of the United States.

If alive today, he would doubtless endorse the good judgment of the Cleveland Railway, which is known far and wide for its advances in electric railway rolling stock, for its extensive use of

PETER SMITH
Hot-Air Forced-Ventilation Heaters

Living in these days, Moses Cleveland would have known that nothing builds up a city faster than good and comfortable car service, both winter and summer. The growth of Cleveland has been due in no small part to its excellent street railways, and part of that excellence lies in the use of

The Best Car-Heating Equipment Available

PS HEATERS

The Peter Smith Heater Co.

Detroit, Mich.

Heater Specialists for Thirty-five Years

PS HEATERS



PORTABILITY and QUICK OPERATION

Two features most necessary in a rail-bonding machine are embodied in the new

LINCOLN BONDING CART

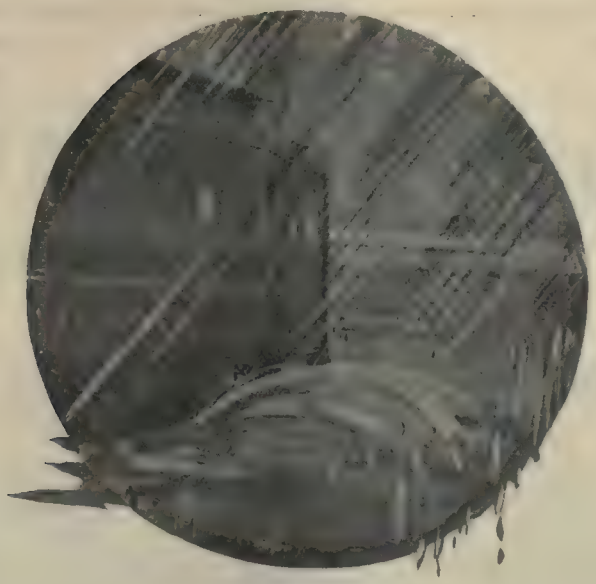
The bonding machine is entirely enclosed in a dust-proof, weather-resisting case and can easily be tied to a line pole and left on the road for the next day's work.

The electric arc obviates any joint cleaning by burning-off scale, rust, etc., and leaves a clean welding surface. The action of the arc makes steel rail and copper bond mingle in a perfect weld—and the operation is so rapid that the crystalline structure of the rail remains unharmed. Machines furnished with either car or carriage wheels.

The Lincoln Bonding Co.

636 Huron Road, Cleveland, Ohio

AGENTS:
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114 Liberty Street, New York City, N. Y.
CHARLES N. WOOD COMPANY
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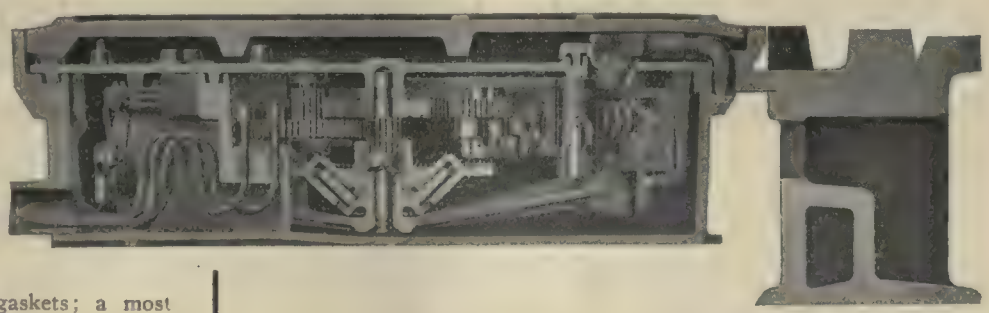


If you've ever faced a condition like this, you'll know what we mean

The "Collins" Non-Splitting Electric Track Switch

does not splash mud and water; the switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed and without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard ears; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

when we say that the "Collins" Non-Splitting Electric Track Switch is enclosed in a **watertight** street box. Not watertight by the doubtful help of gaskets or pipe joints—but completely and totally and positively protected against the entrance of water by use of a **mercury seal.**



In the street box itself is cast a trough which is partly filled with mercury—a flange on the inner cover dips into the mercury.

Putting on the cover automatically seals the box —by the **best** method—our **patented** method.

Not **second**-best—but the **best** method of keeping out water that the **brains,** and **factory facilities,** and **capital** of a big, **stable** organization have been able to develop.

United States Electric Signal Company

West Newton, Massachusetts

Representatives:

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Chicago: Warren Moore Osborn, McCormick Bldg.

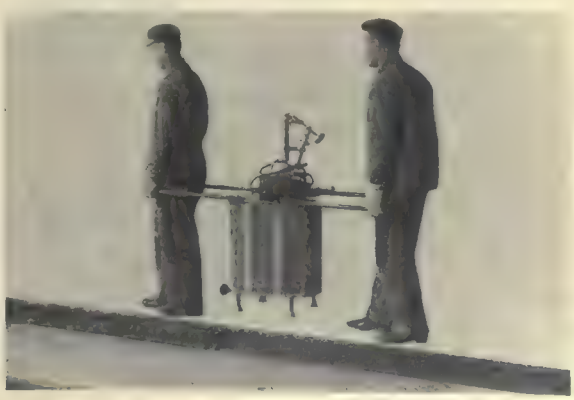
Foreign: Forest City Electric Service Supply Company, Salford, Eng.

Erico Portable Welde

"The Line of Least Resistance"



We offer an Electric Weld bonding outfit which is extremely light in weight and low in cost. It is designed for use on large and small roads alike, and can be mounted to meet local conditions. The complete outfit as shown in the cuts can be easily carried by two men.



The Portable Welder is not intended to take the place of the ERICO Bonding Car or Champion Bonding Outfit. It is designed as a supplement to these efficient equipments and at the same time fills the demand for a low priced welder.

Write for particulars

The Electric Railway Improvement Co.

Cleveland, Ohio

or Erico Welded Bonds

"The Line of Least Resistance"



The Portable Welder installs our standard Electric Weld rail bonds and gives the same permanent weld as is obtained by using our ERICO Bonding Car. The heat is produced by means of an electric furnace. No flame or arc strikes the bond or rail.

The price of this outfit puts it within reach of every electric railway in the world.



Write for particulars

The Electric Railway Improvement Co.

Cleveland, Ohio

The Cheapest Insurance of Good Track



In Dallas, Texas, they are making cupped joints as good as new at a cost of

15 cents per joint

and are removing corrugations at the rate of

500 feet of single rail in ten hours

by grinding rails with the

Reciprocating Track Grinder

And in many other cities they are making equally good records.

When you consider that this work makes a saving in car maintenance costs by decreasing vibration—pleases the public by giving smooth riding—and defers for years the cost of rail replacements and new track construction—doesn't it make the cost of such work look mighty cheap to you?

You can try out a Reciprocating Grinder on your tracks without any obligation to buy.

Railway Track-work Co.

30th and Walnut Sts., Philadelphia



ARMCO AMERICAN INGOT IRON CULVERTS

Give Long and Faithful Service

because of the extreme purity of the iron of which they are made. Large numbers of satisfied users, all over the country, confirm this statement. "Armco" Iron Culverts withstand severe conditions not only because of their resistance to corrosion, but also because their corrugated form and overlapping joints confer ample strength to carry heavy fills and the rolling loads of railway traffic. For use under extreme conditions, they are obtainable in gages heavier than standard.

Write the nearest Manufacturer for information and prices on "Armco" (American Ingot) Iron Culverts, Siphons, Flumes, Sheets, Roofing and Formed Products.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
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Iowa, Independence
Independence Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
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Kentucky Culvert Co.
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Dixie Culvert & Metal Co.
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Wm. M. Baker
Massachusetts, Palmer
New England Metal Cul. Co.
Michigan, Bark River
Bark River Bridge & Cul. Co.
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Michigan Bridge & Pipe Co.
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Lyle Corrugated Culvert Co.
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Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co
Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Lincoln
Lee-Arnett Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
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Nevada Metal Mfg. Co.
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North-East Metal Culvert Co
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Pennsylvania Metal Culvert Co.
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North Dakota, Wahpeton
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The Ohio Corrugated Culvert Co.
American Rolling Mill Co.
Oklahoma, Shawnee
Dixie Culvert & Metal Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal Works.
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Cul. & Flume Co.
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Virginia Metal Culvert Co.
Washington, Spokane
Spokane Cor. Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.



A Thermit Weld Interview with a Pioneer User



An Actual Conversation (name of road furnished on application)

"Maintenance Costs? Why, there ain't any such animal"

That is the way in which the engineer for a well-known company (name furnished on request) replied when I asked him if the maintenance cost on their joints was very high. "When we finish putting in a Goldschmidt-Thermit Weld," he continued, "it's just the same as a piece of the track, and the maintenance on the joint is no higher than on the rest of the rail."

"How about maintenance on your Goldschmidt equipment?" I asked.

"It amounts to so little that we don't bother to figure it. And we've had the outfit nearly four years, too."

I asked how many joints they could make in a day, and was told that they had made as high as forty-one 60-lb. or thirty-six 90-lb. joints in a 9-hour day.

GOLDSCHMIDT THERMIT CO.

120 BROADWAY, NEW YORK

329-333 Folsom St., San Francisco

103 Richmond St., W., Toronto, Ont.

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National Pneumatic Door and Step Control Facilitates Boston Trailer Operation

Trailer operation is a good thing when done right.

One of the ways of doing it right is to use National Pneumatic equipments.

Because they facilitate loading and unloading to such a degree that the trailers do not drag the line.

Boston is doing trailer operation right with the aid of Type O-M 2⅝x10 National Pneumatic Engines on 75 trailers.

We don't sell you Door and Step Control alone. We sell you an increase in line capacity and a decrease in operating expenses.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York — 515 Laflin St. Chicago

Do You Want to Sell Thi

and Transportation Men

Traffic-promoting and fare-collecting conveniences, such as

Modern route and destination signs
Lamps and lamp fixtures
Ventilators and sash fixtures
Heaters and thermostats
Seating and curtains
Safety door and step mechanisms
Signal systems for conductors and passengers
Signals for crossing and track protection
Improved fare boxes and registers
Fenders and wheel guards
Anti-slip step and floor coverings
Metal fittings, baggage racks, etc.
Automatic switches
Automatic signal systems
Telephone systems
Amusement park devices
Tickets and ticket punches

and Electrical Engineers

Power-generating and distribution necessities, such as

Boilers
Stokers
Condensers
Conveyors
Economizers
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Water purifiers
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Steam auxiliaries
Traveling cranes
Turbines
Generators, A.C. and D.C.
Motor generator sets
Rotaries
High-tension switch gears
Transformers
Choke coils
Connectors and terminals
Lightning arresters
Storage batteries
Blower outfits
Switchboard equipment
Poles
Towers
Cross arms
Truss-pins
Insulators
Wires and cables
Signal systems for crossing protection
Trolley and feeder wire
Hangers
Ears
Fuses
Splicers
Strains
Bonds and bond testers
Carbon brushes
Bonding and welding equipment
Tower wagons and auto trucks
Linemen's tools
Splicing sleeves—Guy anchors—Babbitt metal

—who influence or order the purchase of such apparatus for United States electric railway properties, operating more than 48,000 miles of track and 100,000 cars

—then

make immediate reservations for space and copy service in the

Annual Maintenance Numbe

Apparatus to Managers and Way Engineers

Operating equipment and construction materials, such as

Rails and special work
Portable buildings
Storage yard machinery
Bridge and viaduct fabricators
Trestles
Culverts
Ballast and work cars
Concrete mixers
Concrete casts
Cranes
Power shovels
Hoists
Jibs
Derricks and derrick buckets
Hand shovels
Crowbars
Tampers
Drills
Reamers
Paving blocks
Cement
Ties
Track brooms
Clips
Joint and welding equipment
Welds and bonds
Angle bars
Brace plates
Tie-rods
Chairs
Nuts, bolts and spikes
Lock-nuts
Rivets
Washers
Wood preserving equipments
Track grinders
Grinding blocks
Rail filler blocks
Key blocks
Paving joint filler

and Superintendents of Equipment

Rolling stock, car conveniences and shop requisites, such as

Cars and trucks
Axles and wheels
Gears and gear cases
Journal boxes
Headlining and veneer
Trim
Roofing
Brake rigging
Brake-shoes
Car seats
Slack adjusters
Couplers
Ball and roller bearings
Lamps and lamp fixtures
Energy-checking devices
Trolley wheels and shoes
Sleet-cutters
Harps and bases
Headlights
Poles
Catchers and retrievers
Motors and control
Air and hand brakes
Switches
Fuses
Carbon brushes
Connectors and conduit
Junction boxes
Lamps and fixtures
Heaters and ventilators
Seating and curtains
Safety door and step mechanisms
Fenders and wheel guards
Anti-slip step and floor covering
Machine tools
Springs
Bearing metals
Armature, commutator and field coil accessories
Shop tools
Lubricants
Cranes
Shop trucks—Air brakes—Jacks

of Electric Railway Journal
March 17, 1917



Agasote roofing on the new 70-ft. cars of the Michigan Railway.

Agasote Roofing

is not only weatherproof when first installed—its weatherproof quality actually increases in service. It undergoes a molecular action somewhat similar to the action which takes place in the "setting" of cement.

Cement, as you know, is not so strong during its initial "set" as it is after four or five years of service during which the "setting" action is constantly going on. It is the same way with Agasote—its chemical or molecular action, due to exposure to the elements, makes it constantly harder and stronger.

Consider also that Agasote not only affords a **lighter weight** roof construction, but is **cheaper, easier** and **quicker** to put on, and easier to repair.

Follow the example of the Public Service Railway, the Third Avenue Railway, the Michigan Railway Company, and other up-to-the-minute roads—roof your cars with Agasote.

Ask us for details and costs.

The Pantasote Co.

Manufacturers also of Pantasote—the most widely used and highly standardized railway car curtain material on the market

11 Broadway, New York **People's Gas Bldg., Chicago, Ill.**
797 Monadnock Bldg., San Francisco, Cal.

Value for Rate-Making

By **HENRY FLOY**, Consulting Engineer, Author of "Valuation of Public Utility Properties."

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What is the proper basis for rate-making? That is the question which Mr. Floy answers in this book. His views, based on an intimate relation to this work and a broad study of the voluminous discussions, will interest you.

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By **LOUIS E. FISCHER**, Consulting Engineer, St. Louis, Mo.

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A discussion of the principles and factors determining probable profits from interurban electric lines. It is the first book to give actual data showing the results of interurban electric line developments in the United States—a pioneer in a complicated and important field.

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HEAVY GEAR CASES ARE MACHINE RIVETED

One good reason is plain from the picture.

You see a pneumatic riveter in use for making our larger sheet-steel gear cases.

The lighter cases are hand-riveted—

But in each class of work, the riveting is done by men who know correct riveting first, last and all the time.

We can't say too often that we are running a large departmentalized factory—not a repair shop.

SCAN THIS LIST OF OUR CHIEF PRODUCTS

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Armature and axle straighteners
Armature buggies and stands
Babbitting molds
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Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and field coils
Bearings axle and armature
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, rigging, etc.
Car trimmings
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Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail contact-shoes and accessories
Trolley poles (steel) and wheels



Columbia Machine Works & Malleable Iron Co.

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Friction Is Waste

Fifty of these Peter Witt Cars
will minimize friction in the handling of
Rochester traffic

200 of these Hess-Bright Bearings
will minimize friction in the operation of
Rochester cars

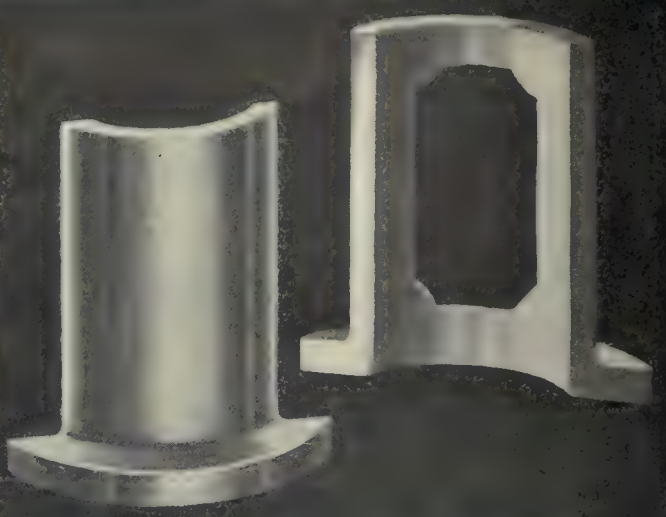
Minimize Friction
Use Hess-Brights



The Hess-Bright Mfg. Co.
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Philadelphia, Pa.



MORE-JONES 'TIGER' BRONZE AXLE *and* ARMATURE BEARINGS



SUCCESS—uninterrupted and positive success has marked the use of MORE-JONES "TIGER" Bronze Axle and Armature Bearings.

The characteristic of "TIGER" Bronze is its dense fine smooth grain which gives these bearings great strength and exceptionally long wearing anti-frictional qualities. When you use MORE-JONES "TIGER" Bronze Axle and Armature Bearings, you are sure of the very minimum of lubricating and replacement expense.

In MORE-JONES Armature Babbitt Metal, you get the finest product of trained specialists of vast experience. It is designed for armature bearing service exclusively. Unequalled for sustained economy under any and all conditions of strain, pressure and pounding.

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MORE-JONES ARMATURE BABBITT METAL

MORE-JONES B & M Co's ST. LOUIS, MO. ARMATURE



Houston, Texas

153 Rico Coasting Recorders ordered by Stone & Webster for Houston

Pleased patrons always return. Following two years' intimate observation of what the Rico Coasting Recorder was accomplishing on its Northern Texas lines, the Stone & Webster Management Corporation placed during 1916 an order for 153 Rico Coasting Recorders, to take care of all cars of the Houston Electric Company.

The reputation of Stone & Webster as railway engineers and operators makes their wider use of the Rico Coasting Recorder of more than passing interest. With their re-endorsement of coasting time as



The True Principle for Measuring Operating Efficiency

another user is added to a chain of railways which now extends from the Atlantic to the Pacific, from the Gulf of Mexico to the Gulf of Vancouver.

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



Cross-section of
G-E Armature Coil

Are you having trouble in getting armature coils?

If you specify G-E armature coils on your next order you will be sure of obtaining coils made of the best materials carefully selected, fully tested and assembled with the utmost care by expert workmen.

G-E Armature Coils

excel in quality because of the following advantages:

Steam Molded—

A steam molded coil will last, all other things being equal, at least 25% longer than one not so treated. All G-E coils are steam molded.

Dipped Leads—

The advantage of dipping the leads of G-E coils is apparent. Insulation will not ravel nor absorb moisture. All G-E coils have dipped leads.

Perfect Fit—

G-E coils, being made for G-E motors, fit accurately into the armature slots. Thus the dangers of abraded insulation from forcing or from vibration in service are eliminated. G-E coils are an exact fit for G-E motors.

Use G-E Coils for G-E Motors—It Pays

General Electric Company

General Office: Schenectady, N.Y.

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*Southwest General Electric Company †General Electric Company of Michigan.

For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.

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TWO FEATURES AT MID-YEAR MEETING

In the Boston meeting two features may be said to have been paramount. One of these relates to the industry itself—the purpose of the gathering—the other to the subject of the national defense. As is clearly evident from the program, which may be assumed to reflect the best thinking of the industry, the relation of employer and employee transcends in importance all other matters excepting only that of the relation of the electric railways to the public. The necessity for basic knowledge of fundamental principles of wages, costs of commodities, living conditions and the like, is clearly seen in the reports and papers presented. The old order of affairs was graphically described in the introductory remarks of James O. Fagan, the tower signalman, whose magazine articles have made his name well known. The new order was well illustrated by the report of the committee on social relations upon methods of securing the economic independence of the employee, increasing his habits of thrift, and caring for him and his family in case of death, incapacity or old age. The topic is a modern one, and many theories are being advanced as alleged remedies for this and that condition. In these circumstances the value of a scientific consideration of the subject such as that given by the committee on social relations cannot be overestimated.

ELECTRIC RAILWAYS BEHIND THE PRESIDENT

The patriotic resolutions adopted at Boston and forwarded to President Wilson are significant in several particulars. The backing of an industry so important as ours cannot but be appreciated by the President in this hour of stress. Not only can the railways be of help in a material way in assisting in the transportation of troops and supplies, but in the matter of men, also, they are in a position to be of prompt and effective service. Their men are under discipline somewhat analogous to that in the army. They are accustomed to learning and following rules, to work of a routine nature necessary to the public service, to responding to emergency calls of various kinds and even to the wearing of uniforms. If needed for service they will, no doubt, respond to their country's call as their brothers did so freely in Great Britain before conscription was resorted to. The committee on national defense, as it is now called, has done well to utilize the opportunity afforded by the mid-year meeting for focusing attention upon the patriotism and enthusiasm of the electric railways. We expect them to be an important factor in any eventualities which may result from the present international tension.

GIVING THE EMPLOYEES A CHANCE

Do you, as an electric railway employer, look outside your organization whenever a man is needed for a more or less advanced position, or do you endeavor to find among your own employees one qualified for the work? This point has been brought to our attention with special emphasis through a recent advertisement in the *Denver Tramway Bulletin* for an engineer to do certain work, it being stated therein that it is the policy of the company to make appointments from within the organization if the right man can be found. Such a policy is immeasurably preferable to that first mentioned, which cannot but result unfortunately for both employees and the organization. When outside men are persistently brought in to fill vacancies without consideration of the qualifications of any existing employee, the practice tends to undermine the ambition of the employee or else eventually leads him to seek work where his future is not so narrowly and unjustly restricted. In either case the company is harmed. What present-day employees want is a fair chance and this should be insured by the management. In this connection we were struck by a recent remark of President Brush of the Boston Elevated Railway, who said: "My job is to make my fellow employees make a success of theirs."

A NEED FOR SPECIALISTS EXISTS

In the case of individuals that have been engaged in electric railway work there appears to be a relatively large opportunity for specialized service during war. For example, electric railway operators are especially well fitted to deal with the problems of detailed distribution which seem to form so important a factor in modern warfare. According to report, it is quite frequently the practice on European battlefields, where troops are deployed over a wide front served only by steam railroads at right angles to it, to construct light railways behind the trench lines and thus maintain a steady stream of munitions along the front. Here should be much for the electric railway man to do in the way of operation—whether steam or electricity happens to be the motive power. In construction work, the services of those who have had experience with maintenance of way on interurban properties should be literally invaluable. All of them have dealt with the laying and repair of track in the open country under conditions that should be more nearly comparable to the rough-and-ready methods of war time than the principles of elaboration and permanence that have become standard for steam railroad practice. In case this nation should take the field there would probably be a great need for specialists along this line and many others.

HALF A LOAF BETTER THAN NONE

Such a maxim may be appropriately used in describing the financial nourishment which, as noted in last week's issue, has been recommended for the Boston Elevated Railway by the special legislative commission appointed to investigate its needs. It was perhaps too much to expect that out of this short investigation any radical departures in the way of revenue increases would be advocated. The investigating commission did well in making a thorough beginning and in frankly going on record as to a disposition to meet fairly the company's immediate and most pressing needs. The management of the Boston company, both present and past, has reason for congratulation in the clean-cut endorsement of its work which may be read between the lines of the full report. The declaration made by the commission that no "water" exists in the Boston Elevated securities will surprise no one familiar with the company, but this statement, with other straightforward comments upon the conditions which handicap the road, will be of value in insuring a wider public appreciation of the company's problems and honest endeavors to perform its duty to the mutual benefit of itself and the public.

The commission feels that the immediate needs of the company will be met by the sale of the Cambridge subway and bridge approach (costing about $9,000,000) to the State, by the return of a $500,000 guarantee fund, by the institution of further prepayment areas where practicable, by the abatement of a portion of the so-called compensation tax and by other steps outlined in last week's abstract. It considers, however, that a more thorough investigation of the efficiency and earning possibilities on the system would be helpful and recommends such a study by the Public Service Commission during the next twelve months. Moreover, the commission believes that a comprehensive investigation of future subway development at Boston may well be undertaken by the Boston Transit Commission in conjunction with the broader inquiry into the net earning power of the company. It recognizes the fairness of the municipality's sharing in the expense of high-cost transit facilities, but it is not yet ready to advocate a positive subsidy or taxation abatement. Fare increase and transfer charge plans must await further investigation, including operating experience under present fares.

"So far, so good," is doubtless a fair characterization of such findings. In trying to reconcile two elements which to it seem opposed—*i. e.*, the company and the riding public—the commission has set up a dividing line between recommended present relief and possible future relief. In other words, it advocates now only such relief to the company as will impose no additional burdens upon the public, but it is fair-minded enough to leave open for future decision the question of the necessity of more direct contributions from the public.

The moral value of the report, even with its limited findings, should be great, for it gives official recognition to public responsibility for successful utility operation. It is to be hoped that the material value of the report will also be realized. If the recommendations of the commission are enacted into law at the present session, the company can serve the public better than is at present possible under the limitation of not being able to issue further securities, and it will, we trust, make at least a close approach to a fair dividend. The latter must be assured in the long run if the scheme of private ownership of a great city traction system under public regulation is to succeed.

PENSIONS FOR ELECTRIC RAILWAY EMPLOYEES

The sub-committee on social relations of the American Association, it will be recalled, began its vitally important work at the last October convention with a comprehensive report on the three elements of "protection" for employees, *i.e.*, life, health and accident insurance. At the mid-year meeting in Boston this week the committee, which has been separated from the committee on public relations and is now a full committee, made further commendable progress in a report to which the greater part of the day was devoted.

In brief, the report contains, first, a discussion of pension theory and practice, with which the committee concludes the "protection" part of its study. It then begins the second part of its work, or that dealing with "betterment" of employees through such means as the best form of wage payments, minimum wage laws, education, thrift, profit-sharing, etc. Along the line of social relations electric railways have probably done as much as any industry in the country, but the scattered plans in use have not before been collated and analyzed in a thorough-going way. In doing this very thing the committee is performing a most valuable service to electric railways, and we hope that appreciation of its efforts will find expression in a careful study of its work as a guide for the future.

To take up the present section of the committee's report, it may be noted that pensions for employees have not been adopted so widely in the electric railway field as have other parts of the "protection" program. Only twenty-five companies have such systems, whereas 118 companies have benefit associations which provide sickness and accident disability benefits, medical supervision and death benefits. The industry, however, is well advanced when compared to other pension agencies. Only four out of 110 trade unions profess to pay superannuation benefits, social insurance evidently being considered by them a matter of secondary importance. Moreover, underwriting agencies for pensions are limited, and their policies are not taken largely by the employees most in need of pensions, and are generally costly. State subvention for indigent old age—as popular as it is abroad—has not been adopted here and would in any event, on account of its comparatively greater cost, probably be limited to real charity cases.

All this, we think, simply tends to show that electric railways have a wide opportunity for constructive work along pension lines. Without going into the technical details of terms, recessions, deaths, etc., it seems to us

that any company in undertaking to establish a pension system must settle two points. Firstly, it should be certain that its plan is actuarily sound. The curse of many municipal and state pension systems has been the necessity for great modifications or even abandonment on account of poor advice and improper determinations of probable cost. The committee has presented an able summary of the cost factors to be considered, but it would, we are confident, be the first to deprecate the lack of expert advice covering the future working of any particular pension system.

Secondly, a railway must decide whether or not its pension plan is to be co-operative—that is, whether it shall finance the whole system or accept voluntary or retain compulsory contributions from the employees. All electric railway pension funds now in operation are sustained by the companies. The theoretical discussion pro and con on this general question is voluminous, and it will not begin to approach the end until there is much more pension experience in all industries. The co-operative feature, however, means complex accounting and elaborate contractual relations between employer and employees, and we are not certain that its conceded merits are worth the trouble of applying it to all parts of employee protection. If we understand the committee correctly, it feels that the preferable protection system would embody a minimum pension plan financed by the company as at present but supplemented by a voluntary contributive plan to provide insurance and promote thrift. On the other hand, Edward E. Rice, in his written discussion of the committee's report, suggests that insurance be handled under the group plan entirely by the employer, and that the co-operative feature be secured through accumulation of pension funds by joint contributions of employers and employees. Alike in principle, therefore, as to the partial use of the contributive feature, these proposals apparently differ as to the part of the social program to which this feature should be applied. Without many experience data on this point, it will be unwise to predict definitely which scheme is more practicable, but it would seem that the burden of proof should be on the plan proposed by Mr. Rice, inasmuch as the proposal of the committee to a greater extent leaves undisturbed the practices already in existence.

On the subject of minimum wage laws, we desire simply to emphasize the point made by the committee that, although as yet the existing acts of this character do not touch electric railways, they may be so extended and are at least a sign of the times. Already public thought is turning even further to the subject of state regulation of utility wages. The outcome, of course, cannot be accurately forecasted, but we believe that there is an awakening of public interest of all phases of utility operation, including labor, that will result in increasing discussion and demands for innovations. It rests entirely with electric railways whether they shall do their own thinking and broaden their social relations work through efficient use of approved methods or leave the industry in large part open to the possible imposition of sociological experiments.

SELLING TRANSPORTATION—AND IDEAS

It is difficult for many to visualize a railway man as a merchant. The merchant deals in tangible goods; the railway in intangible service, yet both have something to sell to the public, and equally need to prove the attractiveness of the offering made. Undoubtedly, each will do some business even without any special sales effort. People have to ride to some extent, just as they have to purchase a certain amount of dry goods and groceries. But to ignore the beneficial effort of salesmanship is to overlook an important factor in the success of every enterprise, whether transportation or department store.

The steam railroads pay a great deal of attention to the business of selling transportation in spite of the fact that most of their business comes from freight instead of passengers, and the opportunities for increasing business in freight, under most conditions, is less than that of increasing business among passengers. One reason for this is that the shipment of freight is largely a matter of necessity while passenger travel is largely a voluntary act and can be developed as a habit. Another reason is that a piece of freight, as a rule, is shipped only once. When it reaches its destination, it is set permanently in place or consumed. With passenger travel, there is no end to the traveling which a person can do except the span of his life. Hence, railways whose business consists largely of passenger travel have greater inducements to develop the traveling habit in their public than those whose business consists largely of freight.

But the sale of transportation is not the only way in which a transportation manager can exercise that talent which consists of being able to convince others that they should accept his ideas. As Mr. Frothingham said in Boston yesterday, the manager has to sell to his trainmen the idea that service with his company is a desirable one as regards hours, wages, working conditions and permanency of employment, when compared with other lines of work in the same town in which they might engage. He has to sell to the authorities of town and state the belief that the service which he supplies is as good as is warranted by the fare paid or, perhaps, that the fare is not an adequate compensation for the service given. He must sell to the public directly served the thought that the local transportation system should be encouraged to make such extensions and other improvements in the service as necessity requires from time to time.

In most of the sales transactions of this kind which the manager has to conduct, he is obliged to meet his patrons by proxy, just as the dry-goods merchant has to conduct his business through salesmen and saleswomen. In transportation service, the sales are conducted largely by the trainmen, and, as Mr. Frothingham says, "there is just as great an opportunity for good salesmanship between the operating men and the public as there is between a merchant and his customer. The principle is the same in both cases, only you, perhaps, have never thought of it in just that same way."

Pensions and Minimum Wage Laws*

Survey Presented to American Electric Railway Association to Show Present Pension Practice, with Analysis of Cost Factors—Terms and Conditions of Industrial Pensions—Corporation Support of Pensions—Types of Minimum Wage Laws, with Results and Future Tendencies

By JAMES D. MORTIMER, Chairman
HENRY C. BRADLEE EDWIN W. RICE, JR.
Composing the Committee on Social Relations of the American Electric Railway Association

A PENSION has been defined to be "a stated allowance to a person in consideration of past services," or "a payment made to one retired from service because of age, disability or other cause." Pension systems have been designed for every purpose from rewards to poor relief. Industrial pensions—that is, pensions to retiring employees—belong in the former rather than in the latter category. Among the various pension plans of electric railways the purposes are described as "in recognition of long and faithful service" or "fidelity and endeavor to advance the interests of the business," "to encourage employees to remain in the service a sufficient time to develop capacity and acquire experience," etc. The purpose of corporation pensions is to finance the retirement from active service of employees who have devoted their productive period to the service, so that efficiency may be maintained, promotions facilitated and employment made more attractive. The idea of securing the greatest permanence of service is perhaps the most important motive. The veterans are an asset to any institution. The purpose is far removed from any desire to be charitable to the "jobless, helpless, homeless, incomeless and propertyless old man of fifty," as Rubinow defines it.[1] Industrial pension systems now in operation in the United States do not limit the pension to those who are in need, but grant it to every employee who retires after the specified term of service at the designated pension age, without reference to the financial condition of such employee, his income, dependence or his family's needs.



James D. Mortimer, chairman of the committee on social relations, presented at the last convention a most thorough report on life, health and accident insurance under electric railway conditions. This committee's report at Boston is equally instructive.

SURVEY OF PRESENT PENSION PRACTICE

Available data as to the expansion of the pension movement are impressive. A review of the field[2] indicates a definite tendency to more liberal pension provisions, but unfortunately, also an utter disregard of the first principles of financing such plans.

While no state has enacted any law for a general system of old-age pensions, many have passed enabling acts under which municipalities may pay pensions to certain employees.

Generally these are the members of fire, police and water departments, teachers in public schools and employees of public libraries, etc. Senate Document 427, dated March 11, 1910, outlines 219 pension systems for municipal employees, comprising forty-eight teachers', eighty-six firemen's, eighty-one policemen's and four miscellaneous funds, covering thirty-one states and ninety-nine cities. According to data furnished by the commission on pensions of the city of New York to the National Civic Federation and contained in its 1916 report, such plans are now in operation in 228 cities. The essential features of these plans are thus summarized by Leonard Blakey in this report:

"For the funds for firemen, seven of the first eighteen cities of the United States do not require contributions, while eleven require from 1 per cent to 2½ per cent, ranging from $8.70 to $29.94 per year. Thirteen of the cities fix the pension at one-half the final salary. In twelve the age of retirement is not stipulated. In the others it ranges from fifty to sixty years. The required length of service for retirement ranges from fifteen to twenty-five years, it being in twelve cities fifteen years; in eight, twenty; in two, twenty-two, and two, twenty-five. Except in Pittsburgh, widows and dependent children uniformly share in this pension.

It is maintained by many actuaries that the larger number of municipal pension plans in force in the United States have been established without expert advice and proper actuarial determination of the probable cost, and that these systems will have to be either greatly modified or altogether abandoned. Frederick L. Hoffman in a paper on "American Public Pension Systems and Civil Service Retirement Plans," read before the Seventh International Congress of Actuaries, says:

"It is evident that American military and most of our state and municipal systems have been developed with an entire disregard of acturial and general insurance considerations. As a result an enormous liability has accrued, which must needs constitute for years to come a serious financial burden on the people at large."

A similar conclusion is reached by Henry L. Rietz in a paper before the American Institute of Actuaries.[3] Evidence of the very substantial liabilities accruing in municipal pensions plans is forthcoming from various actuarial examinations.

George E. Buck, actuary for the pension commission

*Abstract of a report presented before the American Electric Railway Association at Boston, Mass., Feb. 16, 1917.

[1] Rubinow—"Social Insurance," page 302.

[2] A chronological survey of pension movement may be obtained by reference in order to Twenty-Third Annual Report, 1908, United States Commissioner of Labor; "Workmen's Insurance Benefit Funds in the United States"; Senate Document 427, Sixty-first Congress, second session, March 11, 1910, "Pension Funds for Municipal Employees and Railroad Pension Systems in the United States"; Lee W. Squires—"Old-Age Dependency in the United States," 1912; I. M. Rubinow—"Social Insurance," 1913; Tenth Annual Report—The Carnegie Foundation for the Advancement of Teaching, 1915, and "The Problem of Pensions," as presented at the sixteenth annual meeting of the National Civic Federation, January, 1916.

of New York,[4] states with respect to pension systems in New York City:

"The valuation of each fund has now been completed and the total liability of the entire system determined. In round numbers such liability is $216,000,000. Of this amount $9,000,000 is provided by employees' contributions, and there remains a deficiency of $203,000,000 after deducting the funds in hand. Possibly $30,000,000 will be available from the indirect contributions of the city to cover this."

A report to the Massachusetts commission on pensions by Herbert D. Brown, dated March 16, 1914, and covering an actuarial examination of the pension funds of Boston, discloses a deficiency as of Jan. 1, 1914, of $1,312,687, according to H. L. Rietz. The permanent school pension fund of the same city is reported to have a deficiency of $3,728,095 as of the same date, and the firemen's pensions fund a liability of $3,657,100. All of these estimates represent the present value of obligations assumed which should have been provided for through the creation of adequate reserves.

Out of 110 national trades unions only four pay a superannuation benefit.[5] In general, only about 11 per cent of the total benefit payments is spent for purposes of sickness and less than 2½ per cent on superannuation benefits.[6]

Corporation Pensions

The so-called corporation pension plan, providing for retiring allowances financed by the corporation after a certain attained age and years of service, is being adapted by an increasing number of companies. It was first placed in effect by the Baltimore & Ohio Railroad in 1884. Where less than twenty such plans are mentioned in the 1908 report of the United States Commissioner of Labor, fifty-eight pension systems are outlined in the 1915 report of the Carnegie Foundation for the Advancement of Teaching, while fifty-five are contained in the National Civic Federation report of January, 1916. These lists are evidently incomplete.

There is some similarity in these various corporation plans. A period of service is required of from fifteen to twenty-five years. The age of retirement ranges from sixty to seventy years. The amount of pension is based upon a percentage ranging from 1 per cent to 2 per cent of the average wage at time of retirement multiplied by the number of years in service.

Electric Railways

Tabulated returns of the electric railway industry disclose twenty-five companies in the United States with pension systems. Of these thirteen provide compulsory retirement at the age of seventy, one at the age of sixty-five and the remainder at the option of the management. Thirteen likewise provide optional retirement at the age of sixty-five and five at the age of sixty. Of twenty-one pension systems reporting period of service required eight require twenty-five years, eleven twenty years and two fifteen years of continuous service prior to receipt of pension. The amount of pension varies over a wide range. Six plans specify a fixed monthly amount ranging from $20 to $35. Five specify a varying monthly amount conditional upon term of service and other factors, ranging from $15 to $25 and from $20 to $40 a month. Nine systems provide a pension equal to a percentage of the salary for the last ten years, for each year of continuous service. Of these nine, in four instances the percentage is 1 per cent, in one instance 1¼ per cent, in two instances 1½ per cent, and in two instances 2 per cent. Five systems provide a pension as a percentage of the average wage for the last ten years irrespective of years of service. This percentage ranges from 20 to 50 per cent. In all instances the pension plan is financed exclusively by the employing company.

[4]H. L. Rietz—"The Status of Certain Current Pension Funds," American Institute of Actuaries, Vol. III, No. 7, June, 1914.
[5]George E. Buck—"Valuation of Pension Funds, With Special Reference to the Work of the New York City Pension Department," Proceedings of the Casualty, Actuarial and Statistical Society of America, Vol. II, Part 3, No. 6.
[6]Andrews Commons—"Principles of Labor Legislation," 1916, page 397.
[7]Rubinow—"Social Insurance," 1913, page 391.

Cost Factors in Providing Pensions

Just as the most important factor in the cost of life insurance is the chance of death at future ages, so the probable length of time of survival at the retiring age is the important factor in the cost of providing annuities or pensions. According to the American experience table, out of 1000 persons at the age of twenty, 625 will attain the age of sixty, 532 the age of sixty-five, and 416 the age of seventy. At the age of sixty the expectation of living will be 14.10 years, and at the age of seventy the expectation will be 8.48 years. It is frequently claimed that the American experience table assumes a higher rate of mortality than obtains in practice, and accordingly in the valuation of annuities it is usual to employ the McClintock table. This table provides an expectation of life at the age of sixty of 14.64 years. While it is undoubtedly true that the American experience table overstates the probability of death, it appears to err on the side of safety.[7] It has accordingly been used in the cost estimates presented in this report.

Without interest a life annuity of $1 a year payable at the age of sixty and thereafter would cost $14.10 under the American experience table. Interest will considerably reduce this obligation. If payment is made at the end of each year the present value of the pension liability when the age of sixty is attained will amount to $10.44 with interest at 3 per cent, $9.65 with interest at 4 per cent and $8.33 with interest at 6 per cent per $1 of pension. The latter percentage has been used in calculating the pension premiums in this report. A pension of $300 a year would require an outlay, if the age of sixty is chosen as the year of retirement, of $1 less than the convenient figure, $2,500. A pension of $600 a year would require a saving at sixty of about $5,000.

On the assumption that a pension of $300 a year corresponds with an average wage of $800, the total reserve required for the pension would be more than 20 per cent of the wages for the preceding fifteen years of service. This does not mean that 20 per cent of the payroll during the fifteen-year period is required for the pension reserve. Interest would again reduce the amount of annual computation; a number of employees between the ages of forty-five and sixty years would die, and some would retire from service before attaining the pension age. This latter factor of retirements or recessions is most important in effecting a saving in cost in the usual pension system.

Finally, as is the case with all enterprises, there are administrative or overhead costs necessary to operate the plan. Where these consist only of an additional pension payroll, the costs are necessarily less than where costs of agency and solicitation must be added to the net premium rate.

Any consideration of the total net cost of a pension system requires a definition of the character of the plan. The pension plan may be financed entirely by the employer. It may be financed wholly, or in part, by the employee. In the former case there would be no ques-

[7]The combined experience table used by J. D. Craig as a pension cost basis in his report on "Actuarial Analysis of the Cost of Maintaining Various Forms of Insurance Relationship"—Appendix A, report public policy committee National Electric Light Association, 1912 Proceedings, assumes a life expectancy at the age of sixty of 13.77 years. The British Institute of Actuaries' healthy male table has a life expectancy at sixty of 13.81 years and the Northampton table of 13.21 years. The Bureau of Census United States life table, based upon federal census returns in 1910 in the registration area, shows an expectancy at the age of sixty of 13.95 years for males and 14.90 years for females.

TABLE I—SINGLE PAYMENT NET COST OF A LIFE ANNUITY OF $1 PAYABLE AT THE END OF THE SIXTIETH YEAR AND EACH YEAR THEREAFTER

When Payment Is Made at Age of	(a) Without Return of Premium in Case of Prior Death But with Return of Accumulated Reserve in Case of Recession	(b) With Return of Premium and 6 Per Cent Interest in Case of Prior Death or Recession	(c) With Insurance of $8.33 in Case of Prior Death or Return of Accumulated Reserve in Case of Recession
20 years	$0.506	$0.810	$1.557
25 years	0.705	1.084	1.787
30 years	0.983	1.450	2.097
35 years	1.374	1.941	2.516
40 years	1.928	2.597	3.083
45 years	2.765	3.476	3.917
50 years	3.859	4.652	4.880
55 years	5.584	6.225	6.302
60 years	8.330	8.330	8.330

TABLE II—ANNUAL PREMIUM NET COST OF A LIFE ANNUITY OF $1 PAYABLE AT THE END OF THE SIXTIETH YEAR AND EACH YEAR THEREAFTER

When Payments Are Begun at Age of	(a) Without Return of Premiums in Case of Prior Death But with Return of Accumulated Reserve in Case of Recession	(b) With Return of Premiums and 6 Per Cent Interest in Case of Prior Death or Recession	(c) With Insurance of $8.33 in Case of Prior Death or Return of Accumulated Reserve in Case of Recession
20 years	$0.0352	$0.0538	$0.1067
25 years	0.0508	0.0748	0.1288
30 years	0.0744	0.1054	0.1587
35 years	0.1114	0.1518	0.2041
40 years	0.1730	0.2264	0.2767
45 years	0.2853	0.3579	0.4041
50 years	0.5275	0.6320	0.6669
55 years	1.2983	1.4778	1.4845
60 years	8.3303	8.3303	8.3303

tion as to forfeiture of all rights to the pension benefit in case the employee failed to attain the pension age. In the latter case it is certain that the employee would desire the return of his contribution in case he left the service or would desire his family to fall heir to his savings in case of premature death. If he were possessed of prudent forethought he would desire to have the entire saving, which it had been planned would be accumulated at his age of retirement, available as insurance in case of death.

Net costs of pensions may accordingly be computed on three different bases:

(a) Cost without return of premium in case of death before attaining the age of retirement, but return of accumulated reserve in case of leaving employment either to the employee if contributed by him or to the corporation if it has financed the plan.

(b) Cost with return of premium and accumulated interest in case of either prior death or retirement.

(c) Cost with payment of the entire reserve to be accumulated by the age of retirement as insurance in case of death, and return of accumulated reserves in case of retirement before reaching the pension age. This later plan is in fact an endowment maturing at the pension age for an amount equal to the pension reserve.

It has been pointed out that an accumulation of $8.33 at the age of sixty is necessary with interest at 6 per cent to provide a life annuity of $1. A single payment to assure this annuity if made at an earlier age will be considerably less than this amount, owing to the fact that the payment will have an opportunity to compound itself at 6 per cent interest and many persons for whom such an annuity is provided will die before it is necessary to provide annual payments. Such single payments for the three plans described will amount as shown in Table I.

In accumulating the pension reserve the single payment plan is usually considered impractical because of the large initial investment it involves. In order to average out the payments to the reserve an annual equivalent or premium payable at the beginning of each year until the annuity is entered upon is a preferable plan. These flat annual payments will be greater for employees of advanced ages than for younger employees. At the age of sixty, when only one payment can be made before the annuity period is entered upon, it will equal the single payment for a lump-sum premium. Annual premiums at typical ages for a $1 annuity under the three plans are given in Table II.

The premiums already calculated are sufficient to provide pension annuities for all survivors from death at sixty years, but do not take account of the savings effected by employees leaving the service. Since the purpose of the pension plan is to promote longer terms of service, the saving resulting from this recession may be expected to decrease and cannot be discounted in the annual premium rate. It is desirable, therefore, to credit pension expense with the accumulated annuity reserve as such recessions occur. These values will vary with the age at which premiums were first accumulated and with the number of years of accumulation. Typical values of a reserve to pay $1 annuity at sixty under plan (a) are given in Table III.

The reserves in case of plan (b) are equal to the past premiums paid and interest to date, since the reserve is not increased as in the case of plan (a) by the amounts contributed by deceased members. The reserves in case of plan (c) are less than the premiums paid in and interest, since the fund has been decreased by the insurance paid on members dying. Typical tables of such reserves have been discussed in the consideration of life insurance.

The problem of valuing pension funds is often needlessly complicated by considerations of the probability of recession, some actuaries constructing new tables to care for both death and retirement from service. Necessarily the probability of recession will vary and such tables then become useless.

Where the entire pension plan is borne by the employer, as in case (a), the fund to be accumulated if the system is to be solvent can be readily accounted for and corrected from time to time by the following procedure:

(a) Preserve as a separate employees' record, census cards for all employees to whom the pension system applies, thirty years or over, who have been in the company's employ for one full year, noting age and nearest birthday and making additions and deductions annually upon each Dec. 1. Indicate the annual premium upon the face of each card.

(b) Charge "Relief and Pension Expense" and credit "Pension Reserve" annually with the aggregate of annual premiums upon each Dec. 1, plus 6 per cent upon the credit balance to "Pension Reserve" upon that date.

(c) Credit "Relief and Pension Expense" and debit "Pension Reserve" upon each Dec. 1 with the aggregate value of accumulated annuities for employees who have left service during the year.

(d) Charge "Pension Reserve" with special pension payroll, crediting cash as payments are made.

TABLE III VALUE OF ACCUMULATED RESERVE AT VARIOUS AGES OF LEAVING SERVICE

Age from Which Annual Premiums Were Paid	Annual Premium	25	30	35	40	45	50	55	60
20	$0.0352	$0.313	$0.478	$0.933	$1.527	$2.413	$3.585	$5.409	$8.330
25	0.0508	....	0.255	0.739	1.350	2.257	3.464	5.332	8.330
30	0.0744	....	....	0.444	1.082	2.021	3.281	5.215	8.330
35	0.1114	....	....	....	0.660	1.650	2.992	5.030	8.330
40	0.1730	....	....	....	....	1.034	2.513	4.724	8.330
45	0.2853	....	....	....	....	....	1.661	4.166	8.330
50	0.5275	....	....	....	....	....	....	2.962	8.330
55	1.2983	....	....	....	....	....	....	....	8.330

It is usual to express the cost of pensions as a percentage of the active payroll. Just how large this percentage will be depends upon the liberality of the pension provisions. Less than 2 per cent of the employer's payroll is frequently stated as the extent of liability under the usual corporation plan. Very likely this represents out-of-pocket expenses at the present time, but it is very doubtful whether an adequate accumulation of reserves rather than a "pay-as-you-go" plan can be financed with so modest a contribution. Recession plays a very important part in cost, but the added stability which the pension system is designed to give to employment carries with it increasing burdens. Two railroad pension funds in France, established in the sixties, with contributions of 4 per cent of the active payroll, had increased to 12 per cent and 15 per cent in the nineties.[8] The London Metropolitan Police Force shows an increase in the ratio of pension roll to active payroll from 8.5 per cent in 1854 to 29.3 per cent in 1915. In Berlin the pension roll of all civil service employees, excluding police, amounted to 36.92 per cent of the total payroll in 1914. In France in 1912 the pension roll of the national civil service cost 17 per cent of the active payroll, and in Austria the pension roll of the civil service list was 33 per cent of the active payroll.[9] These experiences point to the necessity of accumulating adequate reserves and of valuing the liability for pensions in the method suggested.

Terms and Conditions of Industrial Pensions

The problems of successful administration of the pension system are of an importance equal to if not greater than the consideration of cost. They may be discussed under suitable heads, as follows:

Voluntary, Compulsory and Contributive Plans

The provision made by the employer for the care of retiring aged employees may be in the nature of an annuity to which the employee himself may have in part contributed, or of a pension paid wholly by the employer with no specific contribution by the employee. If contribution is made by the employee, the amount may be compulsory or voluntary on his part.

There has been endless discussion of the question whether pensions should be contributory or non-contributory. It is argued that the employee who will most need the pension—that is, the one receiving the lowest wages—is wholly unable to make contributory payment. Furthermore, few employers deem it advisable to require that such payments shall be compulsory, and experience has shown that in a system of voluntary payments many if not the great majority of employees will fail to join. Most prudent men safeguard the welfare of their families by life insurance, but they are willing to omit any insurance as to their own subsistence after their working period is ended. They undoubtedly cling to the hope of accumulating property by which they shall maintain themselves in old age, and there is the feeling that the hour of incapacity is far away and that through disease or accident it may never be reached. There is the further difficulty that a contributory scheme of pensions is complex, as it involves extensive accounting and contractual obligations for the return of contributions in case of termination of service, default in payment or death of the employee before the pension age arrives, thus further complicating already perplexing problems as to wages and service. Moreover, all contributory systems, whether administered by employers or employees, have difficulty in resisting appeals for assistance for employees reaching the pension age who have neglected to make adequate contribution for a pension, thereby discriminating in favor of such employee.

The objections usually raised to the payment of non-contributory pensions are that they remove the incentive to thrift; that they encourage extravagance and want of forethought as to the future, and that they do not, to say the least, contribute to the self-respect of the employee. It is even alleged that such systems will exert a depressing effect upon wages and will tend to the disintegration of the family.

In this respect it is significant to note the proposed change in the Carnegie Foundation pension fund for college teachers from an endowed to a contributory plan. This plan was established in 1905 by Andrew Carnegie to provide retiring allowances for college professors in the United States and Canada with a permanent fund of $10,000,000 and an approximate annual income of $500,000. In 1908 the benefits were extended to State universities, and $5,000,000 was added to the endowment. The claims upon the fund have increased very materially since its inception. Whereas in the year 1906-7 the amount paid in pensions was $135,687, the amount had increased in 1914-15 to $554,-121. The ultimate obligation, based on actuarial computations, is placed "somewhere between $1,000,000 and $1,750,000."[10] The report states:

> "The fundamental defect in the existing pension system lies in the assumption that free pensions for college teachers would be permanently justified. In the light of ten years of experience and in the light of the experience of European pension systems this assumption seems to rest upon a defective social philosophy. No permanent advantage will accrue to any calling or any profession by lifting from the shoulders of its members a load which under moral and economic laws they ought to bear.
>
> "The man of sixty-five unexpectedly presented with a pension has received a gracious gift. The man of thirty who looks forward over an interval of thirty-five years to its acceptance will pay for it in one way or another before he receives it, and it is in every way to his advantage that there shall be no obscurity as to the question of responsibility or financial certainty. It is further to his advantage that the question of salary shall be entirely separated from the question of pension."

It is proposed to establish a system of life insurance and annuities at cost and broaden the scope of the plan, the Foundation assuming the cost of administration, the cost of invalidity and widows' pensions and taxes, besides guaranteeing a return of 4½ per cent upon reserves. The Carnegie plan contemplates larger pensions than obtain in industrial enterprises, and it has been said that the beneficiaries have a better appreciation of these obligations to provide for the future and the character and working of insurance contracts. While the contributory plan has its drawbacks, there is no gainsaying its popularity, and it is possible that further developments of present pension plans will include some provision in a manner similar to that contemplated by the Carnegie Foundation.

Age of Retirement

Incapacity due to old age is usually assumed to exist at the age of seventy years for males and sixty for females, though numerous plans adopt earlier ages. It is customary to provide for optional retirement when incapacity occurs at an earlier age than that of compulsory retirement, such optional period being five years. Certain existing plans permit retirement at any age after a fixed term of service, usually twenty or twenty-five years. European pension plans usually provide for retirement at seventy, although recent tendencies have been to lower this limit to sixty-five. Sixty

[8] Rubinow—"Social Insurance," page 326.
[9] Pritchett—"A Comprehensive Plan of Insurance and Annuities for College Teachers—The Carnegie Foundation for the Advancement of Teaching, Bulletin No. 9." Data furnished by New York Bureau of Municipal Research.

[10] Pritchett—"A Comprehensive Plan of Insurance and Annuities for College Teachers." Bulletin 9, the Carnegie Foundation for the Advancement of Teaching.

years may be safely assumed as the minimum or voluntary age of retirement except in cases of disability.

Prior Disability

If the employee is incapacitated before reaching the pension age, provision is made in many pension plans for the payments of pension. Employee liability laws frequently provide for limited annuities in the case of disability sustained during employment, and in such cases the pension supplements this compensation. Permanent incapacity operates to reduce the usual life expectancy, and accordingly a pension for the expectancy assumed at the age of sixty or 14.10 years is sufficient to care for this benefit.

Term of Service

Much the larger number of non-contributory industrial pension plans provide for a minimum of twenty years' service to entitle the employee to payment of a pension. A few provide for payment upon fifteen years' service, and others require a minimum of twenty-five years of service. As the pension is based theoretically upon long and valuable service, there is a tendency to restrict the employment of persons of advanced age, many corporations refusing to take on as a new employee any person of more than forty-five years of age. It is provided that service must be continuous, and service is held to be continuous when the employee has not been discharged or has not voluntarily left the service of the employer. In cases of absence of duty through illness or layoff because of reduction of force, no deduction is made when such absence does not exceed six consecutive months. If this kind of absence exceeds six months, the period of absence is deducted from the total term of service. It is usually provided that employees of subsidiary concerns shall be classed as employees of the parent company in respect to eligibility to receive pensions. Provision is also usual in such plans that pensions may be suspended or terminated for gross misconduct, or may be paid to some member of the employee's family rather than to the pensioner himself.

Amount of Pension

The usual basis of payment in non-contributory plans is 1 per cent for each year of service of the average wage for five or ten years prior to retirement; *e. g.*, an employee whose average wage had been $1,000 a year and whose term of service had been thirty years, would receive annually 30 per cent of $1,000 or a pension of $300 a year or $25 a month. Some pension plans provide for payment of a higher percentage, and others have a varying percentage dependent upon the term of service of the employee. Most such plans provide for a maximum pension, the most common limit being $100 a month. The recently adopted plan of the Great Northern Railroad has a maximum of $75 per month or $900 a year. Many pension plans have a minimum varying from $12 to $20 a month.

In recently commenting upon the adequacy of minimum allowances provided in corporation pension plans,[1] Miles M. Dawson states:

"In enterprises where low wages rule a minimum of at least $10 per month, or even $12 to $15 per month, should be fixed. While these amounts may suffice for the bare support of superannuated low-wage employees, especially women accustomed to serve themselves in matters such as cooking, chamber work and laundry, about $20 per month is the lowest subsistence figure for superannuated male employees.

"In considering minima it is well to bear in mind that, when old-age pensions come to be provided by law, whether out of the public treasury or joint contribution, they will be fixed at some generally recognized minimum. In Great Britain this is 5s. per week, *i.e.* about $1.25, roughly equivalent here in purchasing value in ordinary time to $2.50 a week. Our standard of living is higher as well as our retail prices and rents. Probably $20 per month will be the figure here. Larger minima in service pensions or pension funds might cause a larger minimum for old-age pensions, already recognized to be reasonable, to be demanded. The minimum for total disability in workmen's compensation laws is in most states $5 a week or full wages, whichever is smaller."

If the plan contemplates a small non-contributory pension supplemented by a contributory plan under definite contract with specified surrender values in case of retirement, provision may be made for uniform minimum allowances irrespective of years of service or average salary.

[1] Miles M. Dawson—"Service Pensions and Pension Funds," Conference on Social Insurance, Washington, December, 1916.

CORPORATION SUPPORT OF PENSIONS

Both the contributive and non-contributive forms of pension require the financial support and supervisory assistance of the employer. In the case of contributive pensions this may take the form of contribution of a portion of the premium, contribution of the overhead cost if the contributive pension system is handled by the employees' mutual benefit association, guarantee of interest, etc.

The objections to a pension plan supported by a single industry touch largely upon the social rather than the practical aspects of the problem. It is urged that the mobility of labor is hampered, that the possibility of the pension has a tendency to tie the employee to the job and that mobility is necessary to secure higher wages or more favorable conditions of employment. It is even urged that the corporation pension plan is "an obstacle to a concerted action of labor." It is also asserted that corporation pension plans are too arbitrary and their security not absolute.

All of these objections are critical rather than constructive. While the corporation pension is only a partial solution of the old-age problem, it appears to be the only system which is being conducted on economic and business-like lines. It is designed, it is true, to decrease the annual turn-over of labor and make employment more permanent. But there can be no question that the permanence of employment is desirable from an economic standpoint for both the employee and the industry. The idea that mobility is necessary to secure higher wages and more favorable conditions of employment may have applied in an era of competitive handicraft, but it cannot be said to apply in an age of specialized industry on a large and economic scale. It clearly does not apply to the public service business. Where returns are limited, as is the case with regulated public utilities, there is no other incentive for the employer than to pay the highest possible wages afforded by the industry. In addition, it must be noted that state supervision, already concerned with prescribing conditions of labor, is now expanding its regulatory function to embrace a determination of fair wages as well as reasonable returns.

It is true that the non-contributory pension, carrying with it a cessation for the provision of old age when employment ceases before the pension age is attained, does not provide the maximum security and permanence desired by the individual employed. This is the strong argument for a contributory pension plan on a contractual basis, which will assure the return of the reserve value if and as employment is terminated.

STATE SUBVENTION FOR INDIGENT OLD AGE

The United States is the only large nation which does not provide some form of pension in the case of indigent old age. European state pension plans cover a wide and varied range of experience with state sub-

vention.[12] Voluntary plans have been tried in France, Belgium and Italy. Compulsory plans have been tried in Germany, Austria and France, and straight pensions without direct contribution by employer or employee have been tried in Great Britain and Denmark.

The most important voluntary plan is a French national old age pension fund which provides a retiring allowance of $38.42 without return of premiums in case of death, and $25.89 with return of reserve in case of death, for a deposit of $100 at the age of thirty. This plan was subsidized by providing the machinery of administration free of cost and guaranteeing the rate of return, this guarantee beginning at 5 per cent and being reduced on successive occasions to 3½ per cent with direct subsidies for pensions of less than $68.49. Belgium has tried the same plan, and Italy has recently attempted a plan of direct state subsidiaries to minimum contributors. Even with the substantial backing of the state, experience has proved the failure of these measures to meet the general problem of old age relief. The middle rather than the poorer class of people avail themselves of the opportunity, the amount of lapses is high and the pensions provided have been very small. Rubinow estimates that only 8 per cent of the working class in France, or 4 per cent of those gainfully employed, have been so insured.[13] In Italy the number of the insured is estimated at 2 per cent.

Somewhat better success has been achieved by the compulsory plans adopted in Germany, and recently in France, but the pensions are unusually small when measured by American standards. The German pension scheme provides, with the contribution of from 4 to 11½ cents a week by both the employer and employee, a pension ranging from $26.18 to $54.64 a year. The age of retirement is placed at seventy. These pension payments include direct subsidies by the state of $11.90. Employees receiving more than $476 a year are not required to insure, and payments for 1200 weeks are required to secure this pension. The French compulsory plan requires contribution of $1.80 a year by males and $1.20 by females, is limited to wage earners with income of less than $579 a year, and requires thirty annual payments. The pension age is sixty-five, and the pension amounts to $78.78 a year if contributions begin at twelve years of age, and $46.28 in the case of men and $34.71 in the case of women, where contributions begin at the age of thirty.

Great Britain provides straight old age pensions of $1.25 a week for persons over seventy having an income of less than $157.50 per annum. It is evident that such pensions would not be acceptable here with American standards of living.

Some estimate of the pension bill to the United States government, if it undertook to pay such pensions, may be made. According to the 1910 census there were 6,216,674 persons of sixty years and over out of a total population, exclusive of the island possessions and Alaska, of 91,972,266. According to the estimates of population in 1916 as disclosed in the Census Bulletin 133, this number has been increased to 102,017,312. A bill introduced by Victor L. Berger, socialist Congressman, in 1911, provided a pension of $4 a week or less on a sliding scale to all persons of sixty years or over who did not possess an income of $10 a week. Mr. Berger estimated in his speech before the House that the population affected would be 2,675,000, or 2.9 per cent of the total population in the 1910 census. With an average pension of $150 a year, or less than $3 a week, the subvention would amount to more than $440,000,000 a year.

[12] An adequate analysis of the pension plans of foreign countries is contained in Rubinow, "Social Insurance," 1913, and Frankel and Dawson, "Workingmen's Insurance in Europe," 1910.
[13] Rubinow, "Social Insurance," page 342.

It is apparent that any form of state subsidy in the United States as a mere measure of poor relief will require a far more substantial contribution by the government than that afforded by European countries. There is at present a demand for such pensions as more economical and a more humane public policy than institution relief.

This tendency has already made itself felt in legislation in Alaska and Arizona and in the provision for mothers' pensions, these being state subsidies to the mother on condition that she provide a proper home for the child. Nearly thirty American states have enacted pension plans of this kind during the years 1912 to 1915. It is apparent that any state subsidy plan because of its expense must be limited to the most meager form of charitable relief, and that such plans must in any event be supplemented by co-operative action on the part of the industry and its employees to care for adequate protection and a comfortable old age. This will preferably take the form of minimum pensions financed by the corporation, as is now the case, supplemented by some voluntary contribution plan which will provide insurance and a secure method for accumulating and investing savings.

Minimum Wage Legislation

In the United States minimum wage laws have, as yet, been applied only to women and minors and are of little direct interest to the street railway industry, because comparatively few women and minors are employed in this industry and such as are employed receive in nearly all cases more than a minimum wage. The first law of this character in the United States, however, was enacted as recently as 1912, and it is reasonable to assume that similar laws applicable to men will follow if the present laws yield satisfactory results. The inclusion of telegraph and telephone female employees under minimum wage laws suggests that the subject is of general interest to all public utilities and particularly those where opportunities for the employment of women now exist or may occur in the future under the stress of shortage of male labor. Some street railways have already recognized the tendencies of the times and have established a minimum wage for female employees; others are working toward the same end.

The steam railroads during September, 1916, experienced the partial regulation of wages by law. Massachusetts has enacted legislation limiting the number of working hours and spread of duty for street railway trainmen, and similar legislation has been proposed in other States. Publicists state that the public has a financial interest in all public utilities as long as a utility enjoys the right of eminent domain or operates under a public franchise. They urge that the utility business is different from the ordinary industrial or commercial undertaking and may properly be subjected to special laws. Accordingly greater freedom is felt by legislators in dealing with all the parts of a public utility, and one need not be surprised if minimum wage legislation is next extended to the electric railway business.

Existing minimum wage laws, shown in summary form in the table on page 288, are of three distinct types as to method of enforcement, as follows:

(a) Where the specific minimum wage is fixed by the Legislature and embodied in the statute, as in Utah and Arkansas.

(b) Where the minimum wage is fixed by the minimum wage commission, upon the investigations and recommendations of advisory wage boards made up of representatives of employers, employees and the public, and where the commission is given powers of enforcement, and a penalty of fine or imprisonment or both is provided for in case of

violation of the law by payment of rates less than the minimum fixed. States having laws of this class are California, Colorado, Minnesota, Oregon, Kansas, Washington and Wisconsin.

(c) Where the minimum wage is determined as in (b), above described, but where the only power of enforcement is such as results from the power of the commission to publish the names of those employers paying less than the minimum rate. States having laws of this type are Massachusetts and Nebraska.

In some of the early decisions by wage commissions wages were fixed on an hourly or daily basis, and in California a decision which went into effect as recently as April 14, 1916, is on an hourly basis for certain workers and a piece work basis for others. It is clear that this law gives no assurance to the worker that he or she will receive a living wage. The provision for a living wage is more nearly met by a limit on the minimum amount to be paid weekly or monthly, and these are the limits adopted in many recent decisions. To provide for a reasonable living wage, employment by the year, with a prescribed minimum amount to be paid for the year's work, would seem to be necessary. Apparently, this has never been attempted.

RESULTS OF MINIMUM WAGE LAWS

Of the six States in which wage determinations are actually operative, those in force in California and Kansas are of too recent date to admit of any inferences as to their working. This leaves four States, which illustrate the workings of the three principal types of law. For example, the commissioners believe that the enactment of minimum wage legislation in Utah (type "a") has secured these results:

(a) The law has been instrumental in raising the wages of a number of women and girls.

(b) It has not increased the pay roll in establishments employing any considerable number of women, more than 5 per cent.

(c) It has not caused the minimum to become very nearly the maximum wage. A much larger number of employees are drawing a wage in excess of the highest minimum than is paid the legal wage itself.

(d) Most employers admit that they have obtained increased efficiency since the law came into effect.

(e) The law has tended to equalize the cost of production or of selling among the various manufacturers and merchants.

As a result of an investigation the following inferences with regard to the working of the law in Washington (type "b") seem to be fairly conclusive:

(a) That while in the mercantile establishments, laundries and telephone exchanges 60 per cent (50 per cent in the stores) of the women employed were receiving less than the minimum wage prior to the application of the law, the wages of practically all of these workers have been raised to the minimum without serious opposition and without injury to the industries.

(b) That there has been no leveling down of wages, but, on the contrary, a larger number than formerly are receiving in excess of the wage fixed as the minimum.

(c) That the women workers have been neither dismissed nor displaced by cheaper employees, and the number replaced by apprentices or minors is reported to be so small as to be a negligible factor.

How far minimum wage legislation is successful where public opinion is the only influence to enforce the findings of the commission is well illustrated in the case of Massachusetts (type "c"). This State has proceeded very slowly in the work of establishing a minimum wage, and so far its efforts have not proved very successful, as where the employers have been opposed to the schedules adopted by the commission they have simply failed to comply with them.

FUTURE TENDENCIES AND PROBLEMS

When legislation concerning wages and calling for a large extension of the police power of the State is proposed, the creation of a commission to ascertain facts and enter orders based thereon seems to be the tendency of the time. This procedure appears better than attempting to fix wages by statute.

When a State wage commission attempts to fix wages for a given industry, it is confronted with the following considerations:

(a) Testimony of employees that their wage is insufficient, either to
  (1) provide them with the bare necessaries of life, or
  (2) provide them with the necessaries of life and such small luxuries as they feel entitled to;

(b) Testimony of the employer that he is paying wages as high as the profit of his business permits and that to increase wages would cause him great loss;

(c) Opinion of the publicist that increased wages and shorter hours mean lower production costs;

(d) The natural desire of all to receive a larger share of the world's goods;

(e) The differences in ability between individuals.

SUMMARY OF ESSENTIAL PROVISIONS OF EXISTING MINIMUM WAGE LAWS

Findings of Commission how enforced:	Utah	Arkansas	California Washington Wisconsin	Oregon Kansas	Minnesota	Colorado	Massachusetts Nebraska
			By law.	By law.	By law.	By law.	By public opinion.
Industries covered:	All industries.	Certain industries employing more than three females.	Practically all industries.	All industries in which substantial number women employees not paid living wage.	All industries in which one-sixth or more women employed not paid living wage.	Practically all industries.	All industries in which substantial number women employees not paid living wage.
Factors to be considered in fixing minimum wage:	Same standard for everybody throughout state. Fixed by law.	Same standard for everybody throughout state. Fixed by law.	Living wage.	Living wage.	Living wage	Living wage and condition of business.	Living wage and condition of business

(f) Competition in selling prices in the general market for the output of the employer;

(g) Differences in the plants and methods of operation of various employers;

(h) Widely varying opinions respecting the cost of the necessaries of life making up the individuals living budget and the entire absence of reliable data applicable thereto;

(i) Absence of any definite standards of living;

(j) Variations in wage paid the same occupation in other states and in different parts of the same state;

(k) Differences in skill of different employees as managers of their homes;

(l) The fact that some employees accumulate savings while others earning the same wage and supporting no larger families accumulate debts;

(m) Variation in duration of employment with season of year and condition of general business activity.

The fixing of a reasonable wage seems to be no less difficult a question of fact, opinion and judgment than is the regulation of rates and service of utilities; in point of fact, the problem now appears much more complicated. Whether minimum wage legislation will be extended or whether experience so far obtained with it has shown that it is of so little real importance in improving the status of the industrial class as to cause the sociologists to look in other directions, cannot now be predicted with any accuracy.

Under the ideal system of compensation of wage earners, the setting of minimum wages by law or regulation should be unnecessary.

[A section of the foregoing committee report on the subject of employees' thrift was presented in tentative form only and this will be published after it has been put in final form by the committee.—EDS.]

Salesmanship and Its Effect on Electric Railways*

Companies Should Really Sell Jobs to Employees and Train Them as Salesmen of Personal Service—Railways Must Appeal to the Public's Self-Interest to Enlist Its Sympathy

By ROBERT FROTHINGHAM
New York, N. Y.

PRACTICALLY every business has a peculiar lingo of its own—expressions which frequently originate in slang and are finally adopted as fundamentals in sales talk. The advertising field has two of these expressions, of comparatively recent origin, which have come into almost universal use, *viz.*, the words "selling" and "sold" as applied to a convincing argument or sales talk.

Most of us can recall the time when the expression "sold" was identical with a swindle and the word "sell" was used as a noun to express the same idea. In these days of specializing, however, where the personal equation counts so heavily and salesmanship has become an art, the advertising salesman realizes more thoroughly than the salesman in any other commercial line known to me, that in order to sell his space he must first sell himself to his prospective customer. This requires unusual intelligence, tact, judgment and discretion, and a considerable knowledge of human nature. These are the qualities that differentiate a salesman from a mere order-taker. While they hold good in any commercial line, they are absolutely vital to the success of an advertising salesman, because he has nothing to sell but an idea, a plan, a scheme, sometimes sinfully characterized as mere "hot air."



On questions of publicity Robert Frothingham speaks as an authority. He was one of the first to recognize the merit of the modern poster that is now so widely used as a medium for merchandising.

Thus the able advertising salesman, first of all, convinces his prospective client of his own mental integrity, and then if his advertising plan matches up with it we say he has "sold" his man—that is, convinced him. His next and most important job is to keep his man "sold" so thoroughly that no competitor can "unsell" him. These terms have become so current between advertisers and advertising men that we frequently hear an advertiser say he is either partially or completely "sold" on a certain plan or that he is not "sold" at all, which is equivalent to his saying that he either does or does not believe in its effectiveness and apportions his advertising appropriation accordingly.

THE LABOR LEADER IS A SALESMAN

History has failed to record when salesmanship first made itself felt in shaping the world's civilization. Numerous examples from the past and present in various fields might be cited, but perhaps one will suffice to bring the idea closely home to electric railways: The labor leader who makes his appeal to your trainmen, your linemen or your engineers and firemen is ordinarily classed as an agitator—he is accused of attempting to stir up strife. I ask you to look at him as a salesman, even though you may feel that the word outclasses his real personality. The labor leader, in organizing a group of men for the purpose of forming a union, first endeavors to attract them through offering shorter hours, higher wages and the intangible advantages of collective bargaining. His fundamental appeal is necessarily made to the men's own self-interest, as in any case of salesmanship. If you will stop for a moment and look at the matter in the spirit of salesmanship, you cannot but be impressed with the extent to which you are subjected to competition in employing skillful men, and the extent to which the management of your industry fails to employ a similar art in combating such competition.

In the last national election, the National Democratic Committee sold President Wilson to the American people on the basis of "He kept us out of war." The Republicans tried to sell Mr. Hughes to the American people on a number of different issues, such as "America efficient," "America first" and "Protective tariff," but the idea struck the public as too remote and too complicated. It lacked the personal appeal. The current political issues of the day are always sold to the people. The most successful salesman-politician puts his issue over and thereby becomes a statesman. Politics was formerly regarded as a sort of a smiling and handshaking business, the building of fences in the dark of the night, and the practice of militarism in the marshalling of votes, but the business of politics has changed of late.

For years I have urged corporations to partake freely of paid publicity. I have prescribed such publicity, not so much to have companies submit their briefs in public, but with the idea that corporations have, in addition to their manufactured products, good-will and favorable opinion to sell, and that publicity is one of the most direct means of accomplishing this object.

Business corporations marketing a commercial product spend millions of dollars annually to sell their products to the consuming public. The amounts of money thus expended by such corporations are, as a rule, comparatively insignificant when contrasted with

*Abstract of a paper presented before the American Electric Railway Association at Boston, Mass., Feb. 16, 1917.

the amounts of money they spend on productive labor in the manufacture and sale of their goods. Yet a few corporations have spent many thousands of dollars in selling jobs to their workmen. For instance, Mr. Schwab is generally regarded as one of the best steel men in the world. Nobody ever accused Mr. Schwab of being to-day the best steel chemist, the best metallographist, or the best engineer in furnace or mill design. But they have accused Mr. Schwab of being the best salesman. Mr. Schwab not only sells steel and the other products of the Bethlehem Corporation to the consuming public, but he also makes an effort to sell jobs to his workmen.

We all remember how universally Mr. John D. Rockefeller was execrated throughout the country a few years ago for his abnormal acquisitiveness. He tried to change the tide of public opinion by hiring a crafty press agent to write interesting stories of his widespread benefactions and his interest in golf, but the public wouldn't "buy" his stuff—it wasn't a salable article. Then he started in to endow various educational institutions, only to have his money turned down as "tainted." He was a very unhappy man because the public had his "number" and there was none so poor as to do him honor. But when he established the Rockefeller Institute for the purpose of scientific investigation and checking the ravages of disease amongst poor, suffering humanity, he sold himself "hook, line and sinker" to the public. The public bought him at his own valuation and promptly forgot all about the mean things they had said of him, which demonstrated after all that he was a first-class salesman. Then our kindly and paternal government stepped in and, by dissolving his big company into its component parts, increased the value of his stock 400 per cent, thus proving that "virtue is its own reward."

We find another eloquent instance of winning the public's sympathetic support by clever salesmanship in the action of the Interborough Railways of New York during the recent strike, when they appealed to the public from the blatant proclamation of the Amalgamated Association that they would "tie up every car line between Yonkers and Coney Island" unless the Interborough acceded to their demands. That was a trifle too much like "the public be damned." No swollen fool will ever say that again.

Electric Railways Need to Know Selling Game

The electric railway industry, as I am told, is confronted with the most serious problems of its history. You have in city service a fixed fare and rising costs of operation, costs that increase far more rapidly than the best engineering skill can overcome by improvements in the art. You all want an increase in fares, but I think I am safe in saying that very few of you know how you are going to get it. I am told that the mathematics of the subject is thoroughly understood and that almost any electric railway accountant is capable of figuring the paying haul, the cost of extending the transfer privilege and the gradual decrease in rate of return upon utility capital. I have no doubt that all of you believe these facts to exist, but from my casual inspection of the literature of the industry I have not seen in print any method offered by an electric railway man describing how he expects to "bring the rabbit home."

I am not going to offer you a solution, because the problem is rather too technical for my hands, and there are others who are paid large sums of money annually to know just these things. I feel certain that they are working on the problem with might and main. If I could, however, offer them a suggestion derived from my experience in commercial business and my contact with public opinion which would give one new idea toward the solution of the problem, it would give me unbounded pleasure.

Jobs Should Be Sold to Employees

I am of the opinion that the first thing which the industry should do is to sell the jobs to its employees. This selling cannot be made effective or accomplish its fixed purpose by the adoption of the so-called welfare plans, the organization of company sections, the publication of company magazines or bulletins, or the various things which are being currently done by all of you. All these matters will help, but they lack that fundamental appeal which is so essential to success in salesmanship—they lack the appeal to the employees' own self-interest. Not until you have worked out some plan by which you can make such an appeal effective every hour of the day and every day in the year, can it be said that you have really and successfully sold the jobs to the men.

The day is not far distant when the managements of the electric railway industry in the country will grasp the possibilities of salesmanship as applied both to the employees and to the public. Their analysis will carry them sufficiently far to show that they must train all of their employees to be good salesmen. They will first have to sell the jobs to the men. They will develop some plan which will appeal to the employees' own self-interest.

At the risk of suggesting something impossible, it has flashed through my mind that you will work out a plan of compensation for motormen and conductors which will give the trainmen a participation in the increased earnings obtained by the company, say per car-mile, a participation in improved schedule speed, a participation in the saving of expenditures for personal injuries and damages, and a participation in the saving in power consumption for the operation of cars. If such a scheme as this can be developed, it will automatically give your motormen and conductors increased earning power when times are good. Conversely, when times are bad there will be a decrease through the lower earnings of the company.

In order to get the maximum benefit of such a plan, it will be necessary that the scheme be sold to the men. They must thoroughly understand it and appreciate that they are in business with the company, that their co-operation with the management in serving the public is essential to their own well-being, and that whenever they incur additional expense through either lack of attention or carelessness, they are paying a portion of such increased costs. After the jobs have been sold to the men and a fairly permanent organization of street railway service salesmen is developed, your industry will then be in position to go to the public and offer something for the increased fares or shorter hauls which you now feel the industry requires if it is to be maintained on a sound financial footing.

Appeal Must Be Made to Self-Interest of Public

Mere advertising that you are losing money is not going to give you higher fares or shorter hauls. You will have to develop some idea or principle in connection with your railway operation upon which can be made a sound appeal to the self-interest of the public. This may be along the lines of offering the public better service, more frequent operation of cars, more comfortable cars, faster service, more courteous motormen and conductors, more prompt settlements of accident claims, more comprehensive street railway systems or any one or more of the many other things, some tangible and others intangible, which go to determine in the minds

of the public whether the car service is good, bad or indifferent.

Your legal department may be able to advise you respecting the law governing the right of the company to procure an increase in fares or a reduction in the length of haul. It may be able to present the economic facts upon which a regulating commission should improve your financial position. But your legal department, as such, will never be able to procure for you by argument the real goal to which you all aspire. This is a job for the salesman manager, supported by an organization trained in and appreciating the art of salesmanship.

MAKING EMPLOYEES SALESMEN

In regard to the previously mentioned point of making salesmen out of employees after their jobs have been sold to them, it may be explained that there is an increasing demand on the part of the public for a more personal service. In the eyes of the public, the conductor and the motorman are the company's representatives. If they are liked, the company is liked. If they are offensive, the company is offensive. Imagine a conductor saying "thank you" for a 5-cent fare, and yet what an asset such a man would be to his company, and to himself. If he were "sold" on the idea, he would be more inclined to regard his car as a coach instead of a "way freight," and the public would be less inclined to regard it as a flat-wheeled vehicle run by two "roughnecks." Never mind whose fault it is that both parties are misled—the fact remains that they both must be "unsold" on their wrong conceptions if you are ever going to get higher fares or shorter hauls. And it should be remembered that financial participation of some sort will go a long way to make your employees real intelligent sales representatives.

The inculcation of the worth-whileness of this personal-service idea will develop in the men more self-respect, more self-confidence. It can be made the stepping stone to an efficient salesmanship beyond your wildest dreams. There is just as great opportunity for good salesmanship between your operating men and the public as there is between a merchant and his customers. The principle is the same in both cases, only you, perhaps, have never thought of it in just that way.

SELLING WORK SHOULD NOT BE SPASMODIC

It should not be imagined, of course, that an electric railway selling campaign can be successfully carried out in a short time or in a hit-and-miss fashion. It is hard enough for big manufacturing concerns with the most complete distribution of goods and a big annual advertising appropriation to keep the public "sold" on their product and thus prevent a competitor from walking away with their trade. Nothing short of "eternal vigilance" is the price of such liberty. They do not let the public or the retail trade forget them for an instant. The wheels of salesmanship never cease revolving. National and local advertising, window trimming and store cards, sampling to the customer and incessant work with jobbers and retailers by salesmen specially trained not only to sell goods but the advertising policy of the house as well, are all means persistently used until at last the trademark or container becomes synonymous with the product itself and the advertising becomes institutionalized. And all this on behalf of a business the capital investment of which is a negligible quantity when compared to the amount of money tied up in your roads.

Sustained salesmanship pays. For example, if it were known in Philadelphia that to-morrow morning there would be a mob gathered in front of John Wanamaker's store in that city for the purpose of destroying it, you would find an infinitely larger number of people on the spot ready to protect and defend it. Forty years of consistent, truthful advertising has transferred the moral ownership of the Wanamaker store to the citizens of Philadelphia. It is their store as much as it is his. In other words, John Wanamaker has been steadily "selling" himself to the citizens of Philadelphia for nearly a half century. Can you imagine a competitor making any serious headway against him in that big town? If John Wanamaker were the active head of the Philadelphia electric railways, he would have done practically the same thing, because he is a good salesman.

SPEAK THE PUBLIC'S LANGUAGE AND SPEAK IT EARLY

Too many of our big industrial leaders have only grown peevish at bursts of public unfriendliness. They have charged the hostility to demagogues, to muckrakers. The cause lies much deeper than that. Industrial leaders have never appealed to the self-interest of their own employees or the public, neither of whom believe they are getting their money's worth. They are foreigners to the public—these great captains of industry. They speak another language or no language at all. When confronted by trouble or suspicion they fly into long interviews, which the public discounts, if it ever reads them. Or they employ a crafty press agent, whom the public spots, or they buy columns of newspaper space to explain, when it is too late.

After public suspicion gets in the saddle, it is too late to do anything except go and hide for years until the world forgets. The only sure way to enlist the public sympathy is by appealing to its self-interest, and the biggest corporation has to take the same thoroughfare to the public confidence that is used by the humblest merchant.

Leaders of men from time immemorial have built their leadership upon the interests of the men they led. Max Stirner, the great German individualist, expresses the idea in a nutshell: "Every idea, every system, every sacred cause, no matter how great, is outrivaled and modified by each man's personal interests." This is a truism which we all recognize. We know that man is interested in himself first, that his ills are larger than the remedy, that desire is always greater than satisfaction. Trust us to get "ours" in any proposition where a definite advantage is involved! And do you, therefore, blame your employees for taking a similar view? They have never been able to get "theirs" individually, and so they combine and "beat you to it."

The remedy is in your own hands. You must awaken your men to the fact that the job you offer is really worth while, and that they can play their own game most successfully by playing yours. When they are "sold" on the fact that such a plan works both ways, they will be your enthusiastic salesmen with the public. And the most significant development of the whole proceeding will be that you will have successfully "sold" yourselves on a plan which has already proved itself in the history of every successful advertiser in the United States.

The electric railways of the country constitute no exception to the rule. They must pay and pay well for the right men who will, in turn, render that "personal service" which will constitute a bond of sympathy between the railways and the public—a bond to which the railways can tie in the time of trouble. This is salesmanship in its most effective form, for it is the kind that will crystallize and bring to the surface a human sentiment in your behalf which shall be for your industry an indestructible asset.

A Co-operative Insurance and Pension System*

Features of Suggested System Are Its Encouragement of Thrift Among Employees and Its Incentive to Continuous Employment—Employers' Average Contribution Would Not Exceed 3 Per Cent of Wages—Old Established Insurance Company Should Carry the System

By EDWARD E. RICE
Boston, Mass.

THE term "social insurance," like the term "socialism," is open to wide variations as to meaning. To some it may signify a purely gratuitous state system administered by governmental agencies. To others it may denote a compulsory contributory system between employer, employee and state. Others may regard it as a program which must be worked out in the course of time along individualistic lines through a method of co-operation between employer and employee. The latter view is more in accord with the nature of our government and institutions, as well as the character of the people and the conditions under which they live. This interpretation offers to the employer a twofold opportunity: (1) To demonstrate that the benefits included under the term "social insurance" can be adequately provided by the employer as an adjunct to the wage contract; and (2) to prove to himself that the adoption of such a system will in great measure and in due time solve the employment and wage problems with their correlative issues.



For fourteen years E. E. Rice has specialized in the problems of the insurance business and of late has given particular attention to the development of plans for the wholesale insuring of employees of large corporations.

BUILDING FOR THE FUTURE

Under the present abnormal labor conditions, manufacturers feel impelled to pay any price for labor regardless of future conditions. This has an unfortunate effect on industries whose business has remained normal but is bound to become disorganized when the readjustment comes, as it surely must. This brings up the query as to whether the present era of prosperity is not the proper time to build plans which seek to conserve the present earnings of the employee for future use. While it is true that the average employee desires cash in hand in preference to future benefits, this does not justify the employer in granting his wishes, particularly when he knows that it may serve simply as a pretext for demands in future.

The opinion of the average workman is largely formed by others whose interests are counter to the interests of the employer. This influence can only be overcome by the education of the employee as to what really constitutes his own interest. As the cash nexus is to-day the strongest tie between the employer and the employee, the only way to build for the future is through an elaboration and extension of the wage principle. As an illustration, many employers are to-day offering liberal cash bonuses to their employees as a means of holding them to the employment. Others have adopted profit-sharing plans. Both have merit from the standpoint of present value. How much better would it be if, instead of the entire allowance being made in cash, part of it could be conserved and accumulated in a fund to provide future benefits for the persistent employee. It is admitted to-day that the working man does not as a rule provide for the future. He has been taught to spend every cent partly because in the past he may have been obliged to spend every cent, and when he secures an increase in wages, the amount which he can save seems so small that he does not take the trouble to save it.

WORKMEN CAN BE TAUGHT TO SAVE

But the working man can be taught to save. The experience of England to-day furnishes a splendid example of education in thrift. The working man and every member of his family have seized the opportunity presented by the government's small 5-per cent war certificates to save for the future. Prior to the war, the British working man saved nothing. He has now developed a real mania for saving, and why? Simply because the right method was discovered and the right argument applied. While it is true that in the United States to-day there are many open doors for saving, there has not been developed any widespread program of education in persistent saving, and the banking agencies have not as yet offered the right plan or method to induce the small saver to conserve his savings. Records show that only a very small percentage of accounts in banks are in the persistent class. The money is withdrawn and either spent or invested, and, in the latter case, quite often lost in "get-rich-quick" schemes. A form of certificate requiring weekly or monthly payments and convertible into full paid interest-bearing certificates would meet the needs of the situation.

The element of thrift is one of the most valuable features of a co-operative pension and insurance plan between employer and employee. There are many different agencies for thrift besides those included under a general insurance and pension system, and these plans can rightly be considered entirely separate from such a system, but any plan which induces employees to save money, and to continue to save not only while in the employment but thereafter, must be considered as part of a general thrift program. Every employer knows

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that the thrifty man is the better workman because he is steadier and less likely to jump over the traces to gain a temporary advantage elsewhere. The great advantage of a co-operative insurance and pension system lies in establishing a goal for the accumulation of savings, and also in giving the employee evidence from year to year of the progress he is making. To avoid any taint of paternalism, the employee should be taken into the confidence of the employer and shown the real reason for the employer's interest in the adoption of the plan. He should be made to realize that the employer is desirous of his services on a permanent basis, and that the contribution of the employer is one which is contingent on service; that it is not charity but reward for persistent effort.

To make an insurance and pension system fully co-operative, all features should be placed before a committee of employees representing every department, and this committee should act as a working organization to bring the plan to the attention of fellow workmen and to make its details thoroughly understood. The first step naturally is the decision on the part of the corporation as to the plan and the amount of participation. The next step is the selection of a working committee among the employees. This committee may consist of the directors of the local mutual aid association, supplemented by representatives from each department of the industry. This committee would advise with the management as to the carrying out of the details of the plan. The next step is the drafting of a circular announcement furnishing full details of the plan, with card attached requesting the expression of opinion.

The work of the committee then commences in earnest. This consists of the explanation of the plan by open forum held in each section. After the meetings, each member of the committee will individually see the men in his department or section who have not already enrolled and secure their answers. In many industries it is not possible to make the plan compulsory, owing to certain labor conditions, but a non-compulsory plan through efficient work on the part of the committee can be made to include a larger percentage, sufficient to create a strong influence throughout the industry in favor of stability.

Accident and Health Insurance

The first provision should cover not only injuries received as a result of the employment, these injuries being now covered by the compensation acts in the various states, but also injuries outside of the employment and sickness of every kind and nature.

A form of group accident and health insurance now provides benefits for employees as follows: Coverage for twenty-six weeks, fifty-two weeks or longer periods providing indemnity for all injuries not included under compensation acts, and for all sickness at a definite price per $5 a week indemnity, or for a definite percentage of payroll equal to, say, one-half or two-thirds of the average compensation received by employees. A group contract covering such benefits may be issued to the corporation, giving the names of all employees covered, the amount of indemnity in each case and the insuring provisions. This contract is held by the employer. The employee receives an individual certificate stating his own particular coverage under the contract. All settlements of claims under such a contract are made through the corporation, and by the corporation handed over to the employee.

The cost of a benefit equal to two-thirds compensation under the above plan, not covering the first week's disability, providing indemnity for all accidents not now covered under the compensation act, and for sickness up to a limit of fifty-two weeks may vary, according to employment, from 1 per cent to 1¼ per cent of payroll. I recently received a quotation of 1.08 per cent to cover a medium grade manufacturing plant. This low cost would indicate that group accident and health insurance, on account of the low expense rate, may offer a solution for many industries of the problem of health insurance protection as an extension of the present compensation acts.

This form of coverage is also written by several companies under an individual form of policy, but at a blanket rate. The employee in this case receives an individual policy and has the right to continue the insurance after leaving the employment at the same low rate.

There is a substantial saving in cost of disability insurance under individual policies owing to the elimination of a considerable percentage of underwriting expense, especially the expense of procuring the business and of making the collections. A large, responsible insurance company, while making its rates on a basis to yield a profit, is also prepared to accept a loss and still continue to furnish insurance according to contract. In other words, the insurance feature is guaranteed without possibility of extra assessment. Furthermore, an insurance company possessing a nation-wide organization can carry out the continuation of insurance after termination of employment without any embarrassment in the handling of claims. Moreover, such a company is in a position to give first-class service in the handling of all details of administration. Adjustment of health claims requires experience and tact. An insurance company whose organization has been built up to give intelligent service is equipped to co-operate with employer and employee and to give satisfaction in settlement of claims.

Life Insurance

It is admitted that the working man in this country carries practically no life insurance outside of a mere burial benefit. The life insurance companies writing the industrial form of insurance do not pretend to cover the ground, and the average amount of insurance written by these companies per person is no more than a burial benefit. The prime reasons for the lack of adequate life insurance among working people are: (1) Its high cost, due principally to cost of procuring the business and cost of collection; (2) the fact that any method of individual solicitation reaches only a fraction of the working class; and (3) the general indisposition of the working class to look out for other than actual present-day needs.

Within the last five years, a new form of life insurance known as group life insurance has come into being. Under this plan employers may arrange to cover all of their employees or all employees of a certain class for a definite amount of life insurance under a group or blanket contract issued to the concern. In this case, as in the case of group accident and health insurance, the contract contains a list of the names of all employees covered, the amount of insurance in each case and the insuring provisions. These provisions include payment of the full amount of life insurance immediately in event of death of the employee while in the service, and also payment of the full proceeds in instalments yearly in case the employee becomes totally and permanently disabled from accident or disease prior to reaching the age of sixty. This form of insurance is designed to be paid for entirely by the employer, and, according to its terms, the insurance under the group plan terminates when the employee severs his connection with the concern.

Several companies offer a conversion feature in con-

nection with group life insurance which permits the employee to convert insurance under the group policy to any individual life or endowment policy issued by the insurance company within a certain brief time, usually ten days, after terminating his employment. This feature may be adopted by the employer, since the employee in certain circumstances may well wish to avail himself of its advantages.

Group life insurance, on account of the fact that the rate increases with each individual as his age increases, does not lend itself so well on the co-operative or contributory plan. A prominent concern, however, provides for group life insurance on a contributory basis whereby the increase in the rate from year to year is assumed by the employer during the length of service. On leaving the service the employee is then obliged to pay the rate for his age.

As a further adjunct to this plan, this concern offers to refund to the employee, on reaching the age of sixty-five, all payments that he has made for group life insurance in the meantime. This provision is not a part of the policy contract offered by the insurance company, but is a guarantee of the employer.

Inasmuch as the inclusion of all employees or all employees of a certain class precludes the possibility of adverse selection of risks, this insurance is to-day written without medical examination. Furthermore, new employees may be included without medical examination according to the terms of the group contract. Each employee receives a separate individual certificate stating his particular coverage. This coverage may be a stated amount for all employees or may be a graded amount in accordance with length of service. A popular form furnishes employees of one year's standing with $500 of life insurance, with an increase of $100 for each additional year of service up to a maximum of $2,000 of life insurance per employee. Another plan makes the amount of insurance exactly equal to one year's or two years' compensation. The former plan, however, seems to be more popular and is more in accordance with the purpose of co-operative insurance plans, namely, to be an incentive to continuous service.

The rates for group insurance when issued on the non-participating plan vary in accordance with the risk of employment. The cost is based on the combined ages of all employees to be covered. The rate for a certain group, however, is not the rate for the average age of that group, for the reason that the rates naturally increase faster at the older ages than at the younger ages. The probable cost per $1,000 of life insurance varies from $8 to $12, depending upon the variation in ages and the character of the employment. The accompanying table shows individual rates simply by ages.

As to the advantages of group life insurance from the standpoint of the employer, these have been recognized by an increasing number of concerns throughout the country which have adopted this form of insurance. The principal advantage lies in the continuing benefit dependent upon the employment. The award of a cash bonus, equal to what the insurance cost would be to the employer, while perhaps appreciated by the employee at the time, would have no value from the standpoint of retention in service. The possession of a $1,000 life insurance certificate, however, particularly to the married man, not only has value to himself but is also appreciated by his wife and immediate family. The influence of the family can usually be counted upon when the question of change of employment comes up.

Other advantages which have been cited in connection with group insurance are as follows:

Stability of labor.
Reduction in the cost of overturn.
Solution of the transient problem.
Establishment of good shop spirit.
Attraction of good operatives.
A publicity value to the employer.
A philanthropic method of alleviating distress among employees and their families.

CONTRIBUTORY PENSION PROVISIONS

I have now come to the consideration of a plan which embraces the co-operative feature. Group life insurance, as previously stated, is a plan which works out more satisfactorily when the employer pays the entire premium. It was not designed primarily for joint participation. The plan which I shall outline here is one which combines life insurance with the accumulation of funds to provide a pension or life income commencing at the age of sixty-five, the cost to be provided for by joint contribution between employer and employee.

Many corporations now provide a non-contributory or gratuitous pension for long-service employees. This provision usually takes the form of a payment equal to a certain percentage of average salary earned during the ten years previous to retirement, the percentage being based on the number of years of continuous service. Some employers prefer to treat each case individually, having no definite established pension system. These private pension plans are undoubtedly most beneficial in their value to older employees. It is questionable, however, whether they actually accomplish anything from the standpoint of retention in service of the younger employees. The average young man does not look ahead as far as the age of sixty-five. If he thinks at all about it, he is likely to feel that he will probably not be in his present berth when he reaches that age. Most working men like a change in employment. Many of them also are suspicious of a purely gratuitous plan offered by the employer. They are likely to think that if they do not leave the service of their own accord, some reason will be found later for dispensing with their services before they reach the retirement age. Furthermore, inasmuch as the payment of pensions means an obligation extending for many years into the future, the argument of financial responsibility is one which should naturally be considered in the handling of a private pension system.

The joint contributory plan herein outlined meets these objections squarely by furnishing to each employee a contract by a responsible outside financial institution showing his cash accumulations from year to year and his increasing interest in the contract. He does not have to wait until he reaches the age of sixty-five in order to secure a benefit from the arrangement. He receives a benefit at all times proportionate to his years of service. Participation means appreciation on his part of the benefits which he receives, and when he makes payments periodically, he receives a constant reminder of the benefits which he is receiving to-day as well as the benefits which he will receive to-morrow, provided he persists. While in most employments it is probably not advisable to make a contributory plan compulsory, it is believed that provisions can be placed before the employees in such a manner that eventually the majority will become enrolled. One of the most essential, if not the most essential provision of any joint contributory plan should be the continuation feature, that is, the privilege given to the employee to continue the contract after termination of employment at the same rate in whatever new employment he enters. Any arrangement which will entail an increased premium after leaving the service is one which is sure to be frowned upon by the employees.

A large concern, which has adopted a profit-sharing system, is considering a plan which will offer each employee in the profit-sharing class an accumulative bonus

equal to the same amount which the employee contributes, provided the employee contributes at least 50 per cent of the cash received from the profit-sharing account each year. The concern places the limit on a contribution of 5 per cent of the annual compensation received by the employee. After ten years, the employee owns full control of the proceeds of the contract, the funds being invested under a combination of life insurance and pension. If the employee terminates his employment before the expiration of ten years, the employer guarantees to return all deposits which the employee has made with 4 per cent interest, the employee having been insured in the meantime for amounts ranging from $500 to $3,000. Where the employee holds the contract under a definite agreement and can see the increase in his accumulation from year to year, there is offered a strong offset to outside influence.

A Specimen Pension Contract

The following pension provision contract is offered by one of the larger insurance companies to-day:

1. A pension or life income commencing at the age of sixty-five from $100 per year up, with provision for payment of at least ten payments of $100 each in event of death before receiving that number of payments. In event the pensioner lives beyond ten years, the pension is continued for life.

2. Life insurance commencing at $500 from the start and increasing after the accumulation with interest exceeds $500 up to $1,083 at the age of sixty-five, the latter being the final cash value of the contract.

3. Non-forfeiture cash, loan and paid-up values for every year commencing with the second, these values being available under agreement between employer and employee.

4. Waiver of payments by both employer and employee in case the employee becomes totally and permanently disabled before reaching the age of sixty-five, the insurance in this case remaining in full force and the cash accumulations being also available for use.

The employer is to offer to contribute up to 5 per cent of the average compensation earned by the employee, as shown by the previous year's earnings—provided the employee subscribes an equal amount. The employee is to receive possession of the pension contract showing the cash values accumulating from year to year, and also is to receive an agreement from the employer relating to the application of the proceeds of the contract in event of termination of employment.

In event of termination of employment, two courses are open to the employee: (1) To receive the cash value of his part of the contract, or (2) to continue his part of the contract by payments direct to the insurance company. In event of termination of employment, three courses are open to the employer: (1) To give the employee full benefit of accumulations to date in consideration of his years of service; (2) to receive a refund of the employer's full share of his accumulation or (3) to receive a refund of his share of the accumulation less the part which the employee has earned through his years of service.

To illustrate the last, assume that an employer agrees to give the employee full ownership of the accumulations after ten years of service. In event the employee should leave before ten years, he would receive one-tenth of the employer's share of the accumulations for each year of service. This latter plan would entail a forfeit on the part of the employee of a definite amount of cash which might have certain value from the standpoint of retention in service. The employee would, of course, lose the contribution of the employer in the future under any plan in case of termination.

For the purpose of illustrating the amount of insurance and pension which definite contributions would purchase at various ages, assume an employee at the age of twenty, earning $600 per year, contributes 5 per cent. This amount, together with the employer's contribution, would purchase a life pension of approximately $500 per year commencing at the age of sixty-five, with life insurance of $2,500 from the start, increasing in the later years up to more than $5,000 at the age of sixty-five. An employee aged twenty-five earning $700 per year, on the basis of 5 per cent contribution by employer and himself would purchase a pension of approximately $480 per year commencing at the age of sixty-five, combined with life insurance of $2,400 at the start, increasing up to more than double this amount at the age of sixty-five. An employee aged thirty, earning $800 per year and contributing 5 per cent yearly, and the employer a like amount, would purchase a life income of approximately $450 per year, commencing at the age of sixty-five, with life insurance of $2,250 from the start, increasing up to more than double this amount at the age of sixty-five. An employee aged forty, earning $1,000 per year and contributing 5 per cent, would, with the employer's contribution, purchase a life income of $330 per year commencing at the age of sixty-five, combined with approximately $1,650 of life insurance from the start, increasing to more than double this amount at the age of sixty-five.

The contract, although providing for definite values at the age of sixty-five, permits the use of cash at any time prior to that age. It may occur that an employee through no fault of his own is thrown out of employment and needs the use of funds. It is possible for the employer to utilize the cash value of the contract in his behalf, arranging for payment at a later date in small installments. It is not believed advisable to utilize the cash value of the contract except in rare instances. Loss of time through disability and sickness should be provided for by a separate form of contract for the employee.

Estimate of Cost

It is difficult to estimate in advance the exact cost of a pension or life insurance provision until the number participating is known and their compensation received. If the employee has the option of making his contribution from 1 per cent to 5 per cent of his wages and the employer contributes a like amount, the employer's contribution would depend upon the choice of the employee. It is probable that a considerable number of employees will enroll for the minimum amount. I believe as an estimate that the average contribution would not exceed 3 per cent of wages, and would more nearly approximate 2 per cent of wages. With an average wage of $700 per annum, this would mean a contribution of $14 to $21 per year per man. This, however, would be the outside cost, for if the employer should in accordance with the plan receive a refund in case of terminations of service within ten years, these refunds would reduce the cost considerably. According to the cash value of the contract within the first period of ten years, the employer would draw back, in case of terminations, anywhere from 10 per cent to 80 per cent of the total deposits made within ten years. On the assumption that probably most of the changes would be in the earlier years of the contract, as usually happens, the employer would draw back approximately one-half of his deposits in cases of termination, which would reduce the net cost in these cases by about 50 per cent. The reduction in the total cost would then depend upon the percentage of terminations within a period of ten years. This, of course, is largely guess work, but I believe that on a

conservative basis the cost would probably be reduced at least 25 per cent through the refund provision.

CONTRIBUTION PLAN USED BY LARGE COMPANY

Other methods of contribution may be suggested, and the plan outlined below is one which has been adopted by a large concern employing between 5000 and 6000 men. Under this plan each employee who had been in the service for one year or more had the opportunity to subscribe to a pension combined with life insurance as follows:

$500 life insurance combined with $100 pension at the age of sixty-five.

$1,000 life insurance combined with $200 pension at the age of sixty-five.

$1,500 life insurance combined with $300 pension at the age of sixty-five.

Contributions of the employer were on the following basis:

From beginning of second year's service to end of fifth year's service, 10 per cent.

From beginning of sixth year's service to end of tenth year's service, 15 per cent.

From beginning of eleventh year's service to end of twentieth year's service, 20 per cent.

From beginning of twenty-first year's service to end of thirtieth year's service, 25 per cent.

More than thirty years' service, 30 per cent.

Under this plan the average amount contributed was not in excess of $5 per man per year, the contribution here being based on total payments required at various ages. This naturally offered the older man a larger contribution for the reason that the cost of a pension and life insurance combined naturally increases as the age increases. This feature, however, was regarded as desirable inasmuch as it permitted the older men to enter the plan and assist in providing for their own retirement. In connection with this plan, the corporation allowed the employee on leaving the service to carry with him the contract without any deductions on account of termination of service. This left no string on the proposition as a whole, and accounted for its ready acceptance by the employees.

USE OF ESTABLISHED INSURANCE COMPANIES

In advocating an old established insurance company as a carrier for contributory pension insurance, I wish to call attention to the following points:

1. Insurance and pensions call for the payment of funds years and years in the future, even up to forty and fifty years as a limit. This presupposes the existence of an institution large and strong enough to weather all storms and to guarantee the payments without question.

2. Private pension funds have, in many cases, proved disastrous by holding out more at the start than they can ultimately fulfill—the funds not having been based on actuarial practice.

3. A contract in a standard life insurance company has certain values in the eye of the employee not possessed by any other financial document. It represents to him an absolute guarantee entirely separate and distinct from the business under which he operates.

4. Continuation of the contract at the same rates after leaving the service is an important factor in any plan, and the organization of an insurance company lends itself most readily to the complete service of the employee at all times.

5. Life insurance is a necessary part of a complete system, and can best be offered by a standard old line life insurance company accustomed to the rating and acceptance of risks and to administration details.

6. The rates under pension forms of insurance are such as to provide a fair interest return with absolute guarantee of principal. While it is possible that a fund may be conducted showing higher interest returns, it is questionable whether this higher return is equal in actual value to the greater security, flexibility and practicability of a plan administered by an old established insurance institution. The contribution of the employer to the deposit is a better method than that of increasing the interest rate, for the employee has concrete evidence of the actual cash going to his credit from year to year.

SUMMARY

The foregoing constitutes a general outline of a plan which may be varied in its details to suit the conditions of a particular employment. It is not necessary that all parts of the plan be placed in operation at any one time. In one employment it may be desirable to provide sick and accident benefits as a starting point. In another employment it may be desirable to supplement the sick benefits now provided through the local association by life insurance benefits, either paid for by the employees or paid for jointly by employer and employee.

The feature which appeals to most employers in the adoption of a contributory system to provide pensions in the encouragement to thrift which such a plan offers. The employee is made to do something which he would not otherwise do, and he has a continuous incentive to keep saving from year to year. It is, of course, difficult to estimate the exact return to the employer as regards long service, but I believe I am safe in saying that there is a return, and that return is much greater than would be possible under any system of pure cash payments from year to year.

The contribution of the employer need not be as high as 3 per cent or 5 per cent of the compensation of the employee. It need be only such an amount as is necessary to enlist the enrollment of a considerable portion of the employees. As previously stated, the entire plan is one which must be taken up in a co-operative spirit between employer and employee, through the appointment of a committee of representative employees from each department who will act as interpreters in placing the proposition squarely before the men.

GROUP INSURANCE RATES FOR $1,000 OF INSURANCE

Age	Annual Premium	Age	Annual Premium
15	$6.38	50	$13.51
16	6.41	51	14.56
17	6.45	52	15.72
18	6.49	53	16.95
19	6.53	54	18.23
20	6.56	55	19.62
21	6.61	56	21.14
22	6.64	57	22.77
23	6.68	58	24.63
24	6.73	59	26.73
25	6.76	60	29.17
26	6.81	61	31.96
27	6.84	62	35.11
28	6.88	63	38.60
29	6.90	64	42.44
30	6.92	65	46.63
31	6.95	66	51.17
32	6.98	67	56.06
33	7.03	68	61.30
34	7.09	69	67.12
35	7.16	70	72.30
36	7.25	71	78.24
37	7.37	72	84.64
38	7.51	73	91.63
39	7.68	74	99.20
40	7.89	75	107.46
41	8.15	76	116.31
42	8.47	77	126.09
43	8.89	78	136.56
44	9.38	79	147.85
45	9.92	80	160.19
46	10.50		
47	11.13		
48	11.82		
49	12.62		

The Human Side of Industry*

The Humanity Now Exhibited Generally in Individuals Must Become Characteristic of Groups If Industrial Problems Are to Be Solved

By JAMES O. FAGAN
Waverley, Mass.

A FEW months after my arrival in America in the year 1882, I found myself stationed at East Deerfield, Mass., as a telegraph operator on the old Fitchburg Railroad. As a mere youth I had been spending several years in South America and South Africa, for the most part amid very strenuous and savage surroundings. Consequently, at East Deerfield, for quite a while, my mind was too busy thinking about the humanities and inhumanities in life to care much about my physical occupation. I was then in search of the human side of our civilization, and I am sorry to say I found myself a little further away from it at East Deerfield than I had been in Africa among the Kaffirs, the Bushmen and the baboons. In those savage regions they didn't exactly warn you beforehand that they intended to shoot you at sight and throw your carcass to the vultures, but when I first struck the railroad business in America the officials who hired the freight brakemen, for example, were in the habit of asking the applicant for work three leading questions: First—How old are you? Second—Where do you live? Third—What shall we do with your remains? And remember, you must not blame the railroad officials for this state of affairs. As a matter of fact, neither the government nor the social conscience of the nation in those days cared a snap for the living railroad man and of course still less for his remains after an accident.

For a great many years I have been trying to figure out the relationship between my job and society, and I have come to the conclusion that the paramount interests of social order and social well-being demand that the problems of industry, economic and otherwise, be thought out and worked out, as much as possible, from the human and personal points of view. I spent ten of the best years of my life studying the conditions and the prospects on American railroads and the all-impending industrial problems with which the railroads (and the people of this country for that matter) were, and still are, surrounded. From time to time during that period I visited many railroad and industrial centers. Periodically, I worked in mills and I have lived in corporation boarding houses and in the slums of American cities where so many of the problems of society are festering. And after this educative experience, I want to say that industry in this country, both as it is to-day and as it is going to be after the war, calls for the very serious and practical attention of every thinking man.

There are many other ideas for the conservation of American industry and for its adjustment after the war besides the route to which I am going to call your attention. These other considerations are political, mechanical, economical, social and psychological. It is true these several points are factors in the game of American industry, but they are not the game itself. The game itself is preeminently a human game, and humanity and not politics or economics is to be the helmsman of its destinies. Humanity in America to-day has the biggest job on its hands in all its history. It is being called upon to humanize industrial relationships. Believe me, industrial peace is going to be the great big after-the-war problem in America. And neither politics nor the expansion of payrolls is going to bring about this much-desired result. If political influence and satisfactory payroll and working conditions were alone sufficient to germinate good-will you would have industrial harmony on your railroads to-day instead of a hornet's nest of political and industrial intrigue.

After the war, industry in Europe is going to be humanized and harmonized to the limit. From this point of view, and it is vital, industry in Europe will have industry in America beaten from the start. After the war, unless all signs fail, industry in America is going to be handicapped by the clashing of classes. Why not look this situation squarely in the face right now? I tell you, the people of this country to-day are living in a fool's paradise. They do not seem to hear the babel of sound in the world of industry. Antagonisms seem to be multiplying in the ratio of laws that are being put over by those who do not work on to those who do. In order to regulate industry authority in this country seems to be getting it into its head that it is necessary to clip the wings of enterprise, to tax surplus profits, surplus brains, surplus initiative, and surplus democracy. The people to-day are putting their trust in commissions. The commissions can stand it, but God help the employee, the employer, the manufacturer and the consumer when industry has time to take account of its stock under normal conditions, after the war. From a political point of view the biggest business in America to-day is the "canning" business. Political interference usually resolves itself into a bull fight, with industry as the bull, and where industry is not the bull it is the Jonah.

There is a way out of all this muddle, and democracy in America does not yet despair of its handiwork. A new, a healthier attitude of mind toward good business from one end of the country to the other is the one thing needful. The same kind of human policy that is being consistently promoted in so-called big business in this country transferred to the propaganda and policies of the state and federal authorities would introduce a new form of human relationship into American industry. As a matter of fact, the world to-day is splendidly disposed toward industrial workers of every description. Healthier and better conditions, expanding payrolls, permanency of employment, consideration for old age, everywhere you hear the same story, slowly but surely on the way. Consequently, a better feeling, closer and better relationship between employers and employees should be the new gospel of Industry. It is the all-important industrial issue of the times. All kinds of readjustments after the war will depend absolutely on this new human propaganda. To expect employers and employees to settle their differences in an atmosphere

*Abstract of paper read at mid-year meeting of American Electric Railway Association, Boston, Mass., Feb. 16, 1917.

of sensationalism is all wrong. To expect them to do it in a political atmosphere is also all wrong. So it is actually up to the people all over the country to provide the atmosphere in which these adjustments of wages and conditions can be made, and this atmosphere must not be sensational or political but widely considerate, human and square. This is the only way out. It is the key to the problem of industrial unrest. It is the educative process that is absolutely necessary for the protection of the worker and for the conservation of American industry after the war. Its root is Humanity, its name is Good-will.

Good-will in industry then toward industry is a business proposition. It is a three-cornered proposition. It is an attitude of the employer's mind, it is an attitude of the employee's mind, it is an attitude of the public mind throughout the length and breadth of the country. The situation admits of no compromise. This three-cornered proposition must work together or fall together. How are we headed, what kind of mental attitude toward industry are we putting into our jobs and into our politics? That is the great consideration.

So I consider it my business, my privilege, to say to this audience, to ask every audience that I am privileged to address: What is your philosophy of industry? What is your mental attitude toward your fellows, toward your business, toward your employees or toward your job? Have you a cheerful, a co-operative, a personal interest in your work, whatever it may happen to be? If so, I tell you, it is well with you and the society you represent. But if you do not have this co-operative spirit, this partnership idea, this human side, no other plans or economic arrangements on earth will keep industry in America from drifting on to the rocks. It is the human side of industry that has done so much to straighten out the safety situation on railroads, and it is the human side, the appeal to common sense, common interests and common humanity that must now save industry in America from the fate of social and political Europe. I repeat, a better feeling, closer and better relationships between employers and employees, this is the new gospel of industry.

In the next place, I want to give you just a few words of homespun philosophy. Amid all the turmoil of the world's discordant as well as its benevolent activity, I want to remind you that we are not running the universe. The universe is running us. The route from chaos to Christianity is a link in a mighty plan. It is for us to study the symptoms, the tendencies of universal progress, to get the main features of this plan into our heads and as best we can, to become a part of its grand, Christian spirit.

Now, if we will only take the trouble to let our minds dig down deep into the problems which society to-day is being called upon to work out, we shall find ourselves confronted with a great primal proposition or tendency, namely a God-given mission to widen the range and extend the operation of human brotherhood. This brotherhood side of our civilization is its enduring side as well as its primal feature. The brothers and the sisters of the races live forever in the hearts of the people. The names of Plimsoll, Shaftesbury, Florence Nightingale, Dorothy Dix, Phillips Brooks, David Livingstone and Abraham Lincoln are reminders of this great human fact.

We find this brotherhood tendency, I say, working itself out in every trunk line of American progress at the present day; in religion, in art, in education, in science, and most persistently and thoroughly, perhaps, in American industry. Industry in this country is now being humanized from cellar to garret. For every day that passes, work in the mills, in the shops and on the railroads is becoming safer, pleasanter, more healthful, more secure and more remunerative. Furthermore, never in the history of the world have individuals as human beings and neighbors been so kindly disposed towards each other in personal and social relationships, and yet, at the same time, never have the groups of these same individuals been so restless in their industrial relationships, and never, perhaps, has society been so menaced by different political and industrial problems. What is the reason for this seemingly inconsistent situation? Why is it that from the beginning of historical times your group, large or small, in its relationship to other groups has nearly always been savage? From the beginning, I say, your political groups fighting among themselves, as it were, have always been making trouble for society, and now your industrial groups are very busily playing the same game. In the past the human individuals in any given group have seldom been sufficiently numerous or plucky to dominate the group machinery. In Europe to-day the spirit of humanity and righteousness is engaged in a life and death grapple with group machinery. An industrial struggle of the same desperate nature is now under way in America. Happily, however, the eyes of the people are beginning to open to the real nature of the situation. In other words, there is a revolt to-day in this country against group savagery, regardless of its nature or interest. For example, a railroad brotherhood must demonstrate that it is an American brotherhood, and if the right to strike means the right to inflict suffering on millions of innocent people, the contempt of public opinion will very quickly crush that kind of railroad brotherhood. A railroad strike is a savage, inhuman, unpardonable proceeding. And the public feeling in regard to it at the present day points to the fact that the great brotherhood plan of the universe is slowly but surely working to the surface in America and before long it will come into its own.

In any movement for the spreading of good-will in the industrial world, the first thing necessary is to talk it up and work it up in our local interests as well as in the name of the national welfare. In many respects we live in a very queer old world, and for the most part progress has actually to be driven into people. As a rule we have to be pursued and persuaded, and cornered sometimes even, to serve our best interests.

Again, in order to propagate this good-will faith in American industry we need a lot of courage, the courage of our convictions. Industry to-day in this country has many enemies, the most harmful, perhaps, being legislators of the sensational type. Some of these men look upon an industry as a political experiment station. Industry baiting in America to-day is getting to be a sort of profession.

It seems to me that industry in America is fast lapsing into the condition in which its heart is all right, but its body is being battered to pieces by too much political attention of the football variety. So I commend to everybody the come-back and get-back spirit of that game.

In a word, industry in America needs to put on the whole armor of its administrative and operative humanity. Peace and good-will in industry, peace and good-will in society and in the home—this is the combination that cannot be divorced. Not a rainbow vision or a star dream, but a healthy Christian interest in the conservation of American industry by the human route. This is the good word to all the people in every land; it is the gospel of the Galilean sifted down through the centuries and focused in all its penetrating significance on American industry, on American civilization at the present day.

Proceedings of A. E. R. A. Mid-Year Meeting in Boston

Attention of the Delegates Was Taken Up by Social Relations Report and Papers on Wage Arbitration, Salesmanship as Applied to Electric Railway Operation, and Similar Topics—Association Indorsed Universal Military Service—Large Attendance at Banquet in Evening

THE feature of the program at the mid-year meeting of the American Electric Railway Association at the Copley-Plaza Hotel in Boston, Mass., on Feb. 16, was the report of the social relations committee, together with the written discussion thereon. Important and interesting papers, however, were presented on other and somewhat allied topics, such as wage arbitration and contracts, salesmanship and the human side of industry. Practically no floor discussion was carried on in spite of the large attendance, but it was believed that most members realized the importance to the industry of the work accomplished.

The meeting was opened at 10.30 a. m. with L. S. Storrs, president The Connecticut Company, New Haven, Conn., in the chair. The first order of business was the presentation of resolutions that had been approved by the executive committee. One of these, presented by W. Caryl Ely, New York, N. Y., past-president of the association, covered the sending of a telegram of support to President Wilson in the present critical period. This resolution, adopted by the delegates, resulted in the following message being dispatched to the White House by President Storrs:

"The American Electric Railway Association assembled in annual mid-winter conference in Boston presents respectful greetings. Its gathering in Washington two years ago was made memorable by the splendid address with which it was honored by you. Now in the midst of what may be a national crisis, and when responsibilities rest upon the President that are well-nigh crushing in their momentous character, the association tenders to you, the President of the United States, this expression of its confidence, and pledges its patriotic support of all measures which you may take in upholding the dignity and honor of our country, and the rights, property and persons of its citizens on land and sea."

The other resolution, read by Secretary Burritt and likewise adopted, pledged the association to the principle of universal military training and service in the following words:

"Whereas, The future peace and prosperity of the United States depend upon its ability to defend its rights and its shores against invasion, and

"Whereas, Two years of war overseas have shown to us the need of a citizenry trained to arms, and



In his administration of the affairs of the American Electric Railway Association President L. S. Storrs is giving to the industry the benefit of his scientific training combined with extensive steam railroad and electric railway experience.

"Whereas, Our own history has demonstrated the folly of depending for defense upon raw or untrained troops, therefore, in the interest of public safety and for the protection of our homes, be it

"Resolved, That it is the sense of this meeting that legislation should be immediately enacted providing for universal military training and service, thereby placing the burden of defense equally upon all men of military age regardless of their social stations, which is in accordance with the true principles of democracy."

The report of the committee on social relations was presented by its chairman, James D. Mortimer, president North American Company, New York, N. Y. The two sections of the report on old age pensions and minimum wages are abstracted elsewhere in this issue, while the one on employees' thrift, which was presented in tentative form only, will not be published until it has been put in final form by the committee.

In general, however, it may now be said that the section on thrift summarized data from government and other sources showing the relative expenditures of employees for various necessities, and outlined the general principles seeming to underlie the disposition of wages. The report also described in detail the various means that have been used to promote thrift, such as industrial insurance, savings banks, building and loan associations, the postal savings system and the Morris Plan banks. The report then developed a method for ascertaining the tendency in thrift, finding this to have increased, but only in the case of the one-quarter of the workers who earn more than a living wage. There is nothing absolute, it was said, about the relationship between a fair wage and thrift, for thrift is simply a habit of the mind. Yet as a general proposition it seems that the benefits of thrift will not be secured until the financial surplus possessed by the workers is increased by means of some productivity basis for wages.

President Storrs congratulated the association upon having a committee willing to give time for such a serious study as the whole report involved, and then a written discussion on the report was read by E. E. Rice, Boston, Mass. This is presented elsewhere in abstract form. Theodore F. Green, trustee Rhode Island Company, Providence, R. I., amplified previous references to the Morris Plan banks by stating that

these sell installment investment certificates as well as lend on credit and approved indorsers. In view of the work of these banks in restricting loan shark frauds, the investment feature has not been emphasized, but it exists.

Matthew C. Brush, president Boston Elevated Railway, and P. F. Sullivan, Bay State Street Railway, welcomed the delegates to the city and placed the local properties at their service. The scheduled paper on "Wage Arbitration and Contracts," prepared by Bentley W. Warren, Boston, Mass., was then read by W. F. Ham, vice-president Washington Railway & Electric Company, Washington, D. C. One query raised by this paper was as to whether or not the time has come for the enlarging of the jurisdiction of the public service commission to include the adjustment of wages and working conditions of employees.

Mr. Warren traced the development of the principle of control of utilities by bodies created by the state legislatures, and showed how it had resulted in the application of many restrictions to these properties. While the utilities had thus been restricted, they were criticised for not making suitable provisions for depreciation. The regulative bodies, at the same time, paid little attention to such matters as the expenses of the business and the control and reduction of these, as well as the relations of the carriers to their employees. They considered the quality of the service and the public safety, but not the cost of the service. Attention might well be given to labor matters, so that the carriers could get the best possible employees at the minimum permissible wages. On account of the public interest in this field, there are greater difficulties in regulating wages than in other industries.

In general, Mr. Warren said, the public approves collective bargaining and efforts to improve conditions of employment, but takes no part in these matters. In time, however, it must pay the increased cost. The system of contracts has been developed to meet present conditions, but with only two bargaining parties, both at a disadvantage. One wants to get more, the other to keep costs down. Obviously contracts should insure consideration for all of the three parties concerned. In early days the employer had the advantage in making contracts, but under present conditions the reverse is true. At present, the concessions made by employers in some contracts interfere with discipline.

Mr. Warren did not claim that wages are too high, but merely that the rate of fare is not only relatively but is absolutely lower than it was, measured in terms of service. He also urged that contracts should prohibit strikes, which are still brought on sometimes through infractions of discipline. Both parties agree to the difficulties of drawing suitable contracts, but have not found a way to gain the assistance of the public. Arbitration is usually resorted to, but is not a complete solution. There are difficulties in the selection of points to be arbitrated and later in instructing the third arbitrator, who is often unfamiliar with the technique of the business. The findings are not binding on the regulating bodies, and where the wages are raised the companies must pay without the right to increase the rate of fare. The natural tribunal for wage adjustment seems to be the public service commission, which is qualified to pass upon the points involved as it is familiar with the operating details of the companies. Its decision regarding discipline would be accepted by the carriers.

After Mr. Warren's paper a recess was declared until 2.30 p. m. Then the delegates listened to a paper on "The Human Side of Industry," by James O. Fagan, Waverley, Mass., and one on "Salesmanship in the Electric Railway Business," by Robert Frothingham, New York, N. Y. These are abstracted elsewhere. Without discussion the delegates then adjourned until the reception and banquet in the evening.

A. E. R. A. Executive Committee Meeting

Col. T. S. Williams Resigns as Vice-President at the Meeting in Boston—Report on Co-operation with War Department

THE American Association executive committee met at the Copley-Plaza Hotel on Feb. 15, and transacted the following business:

After the approval of a number of applications, reinstatements and resignations the secretary reported that there are now in good standing 356 railway company members, 213 manufacturing company members, 1289 individual members and 1732 company section members.

Among other items of interest the secretary stated that the proceedings of the 1916 meeting are practically ready for distribution, that a special committee on protection at grade crossings has been appointed, that there have been 100 requests for data on sixty subjects which have been supplied by the information bureau, that sixteen publications of miscellaneous character have been issued, and that the association is now represented in Washington by S. S. Perry.

An estimated budget of expenses and receipts was presented by the secretary and appropriations to the affiliated associations were approved as follows: Accountants' Association, $1,500; Engineering Association, $4,500; Claims Association, $1,200; Transportation & Traffic Association, $3,000.

General George H. Harries explained the plan and purpose of the committee on co-operation with the War Department, the name of which was changed to "committee on national defense." A resolution was adopted for reference to the association at the mid-year meeting, pledging support to the government. A resolution was also discussed and adopted preparatory to presentation at the meeting, favoring universal military service.

Progress reports were received from the committees on federal relations, valuation and compensation for carrying United States mail. It was also decided to appoint a special committee on co-operation in the use of special libraries. A suggestion received from J. K. Choate, looking toward a plan for securing a general increase in rates of fare, was referred for consideration to the appropriate committee. Other routine business included authorizing the president to appoint the usual convention committees and empowering the convention location committee to select the convention city. A report of the sub-committee on relationship of manufacturing companies to the association was received, discussed and referred back to the sub-committee for further consideration.

The resignation of Col. T. S. Williams as vice-president of the association was received and accepted with great regret. In explaining the necessity for this action Colonel Williams states as follows: "I understand that it is customary for the association to promote its first vice-president to the presidency. The president and other members of the executive committee have known for some time I could not consider assuming the duties of president even if the association should do me the great honor to promote me to that office, and with this in mind I preferred not to be elected first vice-president at the last annual meeting. I was pre-

vailed upon, however, to accept this office with the understanding that I would resign during the present year. Inasmuch as the mid-year convention presents an opportune time for this resignation, I therefore resign as first vice-president, effective Feb. 15, 1917, so that my successor may be chosen at the time of that meeting."

In attendance at the executive committee were: L. S. Storrs, Richard McCulloch, J. H. Pardee, R. E. MacDougall, J. J. Stanley, George H. Harries, M. R. Boylan, C. L. Henry, W. Caryl Ely, Thomas Finigan, H. C. Donecker, E. B. Burritt.

To fill the vacancy created by the resignation of Colonel Williams each of the other three vice-presidents of the American Association were advanced ad interim in order, and Matthew C. Brush, president Boston Elevated Railway was appointed fourth vice-president ad interim.

Mid-Year Meeting Banquet

Patriotism the Keynote of Several Speeches—President Wilson Replies to Message Pledging Support That Was Sent by the Association During the Convention

ABOUT 600 members and guests attended the annual banquet at the Copley-Plaza Hotel on Feb. 16. Chairman M. C. Brush presided before and during the dinner, before the serving of which an impressive flag-raising ceremony was held. In one corner of the hall a tall pole had been erected with the base banked in palms. Through the hall, which was darkened save for spotlights thrown upon them, two marines, two sailors and two coast artillerymen marched to the foot of the pole. At a bugle signal they raised the flag and the audience sang the national anthem. The dinner was interspersed with unusually hearty singing, in stimulating which Chairman Brush had the assistance of an excellent male quartet. Afterward the quartet sang the "Toreador Song" from Carmen, "The Rosary" and the quartet from "Rigoletto." Mr. Brush then turned the meeting over to President L. S. Storrs, who in assuming his duties as toastmaster referred to the fact that it had been twenty-one years since the association had met in Boston.

The first speaker was Lieutenant-Governor Calvin Coolidge who brought a message of welcome from the governor and on his own behalf emphasized the need for sound and rational methods of control of public utilities. Quoting an early writer on the subject of electric railway transportation he referred humorously to the large profits formerly possible in this business while at the same time the utility was promoting the public welfare. He thought there was a need to get back to first principles along these lines.

James M. Curley, mayor of Boston, the next speaker, congratulated the association that it had elected Matthew C. Brush a vice-president of the organization. Mr. Brush, he said, recognized the trend of the times and the necessity for publicity in corporation affairs. The speaker believed that the public did not realize that the expenses of railway operation and taxes had increased while fares remained as they were twenty years ago. The report of the commission to investigate the Boston Elevated situation had been of great help in clearing up the matter. In conclusion, Mayor Curley said that if other electric railway companies followed the practice of the Boston Elevated in taking the public into their confidence they would do well.

The third speaker was Martin W. Littleton of New York whose address was of a highly patriotic nature, with the ideals of democracy as the basis. He said that the men who are advocating preparedness will pray for peace with those who expect peace on the condition that the latter help in preparing for war. "We will thank God for peace if it comes, but they will thank us for preparedness if war comes." Mr. Littleton emphasized that we are called upon to defend the ideals on which our constitution is based, the individualistic rights of our citizens. Among these is the right to possess property which is the material sign of liberty. In this country the Supreme Court stands between the people and the government to prevent the transgression of the rights of the individual, in marked contrast to the condition in Germany. He closed by expressing the belief that in the defense of its ideals this country is safe.

After Mr. Littleton's address President Storrs outlined briefly the efforts which had been made by the committee on co-operation with the War Department under the direction of Gen. George H. Harries. This is explained in detail elsewhere in this issue in the reports of the executive committee meeting and the general meeting. Mr. Storrs read the following telegram received from President Wilson in response to one sent him earlier in the day:

Washington, D. C., Feb. 16, 1917.

"L. S. STORRS, President American Electric Railway Association, Boston, Mass.

"Please present to the members of the American Electric Railway Association my very warm and grateful thanks for the message of confidence and support they have been gracious enough to send me and convey to them my warmest and most cordial greetings. Messages such as theirs make the task easier to carry.

"WOODROW WILSON."

The final address was by Job E. Hedges of New York. Mr. Hedges referred to the day as being about midway between the birthdays of Lincoln and Washington and said that the great lesson to be derived from their lives was that they believed they had a mission to protect that for which this government stood. Mr. Hedges spoke about the condition of foreign affairs and also the present steam railroad situation and said we must protect ourselves against both foreign attack and indifference at home. His speech contained many epigrams. A typical one, relating to the present situation was: "It is a great thing to have the mind and spine synchronize."

The banquet closed with "America," sung by those present.

Handling Passengers at Stations

A report on a proposed rapid-transit plan for Sydney, Australia, made after extended studies of rapid-transit operations in cities of the United States and Europe, contains a chapter on the subject of passenger movement. In this the conclusion is drawn that elevators, as a means of handling dense railway passenger traffic to and from stations, are out of date. They have been superseded by moving stairways, which, when 4 ft. wide, are capable of handling 10,800 passengers per hour. Passages and ramps can accommodate thirty-five to forty persons per minute per foot of width, and stairways can accommodate thirty persons upward and eighteen persons downward per minute per foot of width. Entrances to stations can be less in width than the exits because passengers arrive at a station intermittently, while they are unloaded in great numbers. With regard to station design, the report states that a dead-end station (unless of a special design, which is not always possible on account of the expense) reduces the train capacity of a railway by about 20 per cent. Modern terminal stations are being constructed where possible with loops and such stations have the same train capacity as the railway.



Chicago Surface Lines New Clubhouse

The employees of the Chicago Surface Lines are enthusiastic over their new clubhouse which was opened last month. The illustrations show the external appearance of the building, the pool and billiard room, the chess and checkers room with adjoining library, the auditorium, which has a seating capacity of 600, a large stage and an excellent floor for dancing, the indoor golf course, the swimming pool and the attractively and comfortably furnished lounging room. The building was described in the ELECTRIC RAILWAY JOURNAL of Feb. 3, 1917, page 202, in the account of the opening reception. The membership of the club includes a women's auxiliary of eighty members, and it is planned to reserve the swimming pool and bowling alleys for the ladies one evening a week.

The Chicago Surface Lines Club is only two years old, but it has done much in fostering the feeling of good fellowship and common interest among the employees. The activities will probably be extended later to include educational features, and it may eventually become a section of the American Electric Railway Association.





NORTH SHORE GRADE-CROSSING PROTECTION—CROSSING GATES PAINTED IN STRIPES TO ARREST ATTENTION; CONTACT DEVICE FOR WIG-WAG CROSSING SIGNALS

Eliminating Crossing Accidents

The Chicago, North Shore & Milwaukee Railroad Has Invested Over $20,000 in Wigwag Signals and Gates to Protect Grade Crossings on Thirty-three Miles of Line

PRACTICALLY the first official act of Britton I. Budd when he became president of the Chicago, North Shore & Milwaukee Railroad was to instruct the chief engineer, B. J. Fallon, to protect the crossings along the north shore so that the safety of pedestrians and vehicles might be assured. The Illinois Utilities Commission had previously ordered the former management to protect certain crossings, but after study of the conditions, Mr. Fallon installed protection not only on the crossings specified by the commission, but also for every crossing from the Evanston terminus to Waukegan, a distance of 25 miles, and included also in the work the 8-mile branch line to Libertyville. The south end of the North Shore line passes through the rather thickly-populated suburban residence section of Chicago, and the crossings are therefore numerous and the traffic over them is quite heavy. This condition, together with headways of fifteen minutes and less, in both directions on the double-track line, warranted special protection for every crossing from an economic as well as humanitarian consideration.

In this 25 miles of route there are forty-eight grade crossings and six overhead crossings. Protection has been given by automatic flags at twenty-five crossings, by crossing gates at fifteen, by electric bells at three and by flagmen at five. Four auto-flags are installed also on the Libertyville branch. The flagmen are used at crossings where the village authorities would not allow gates or auto-flags. In one location the residents objected to the crossing bell, and rather than lose this much of the safeguard, the company replaced it by a flagman. These flagmen use the white enameled disk on which the word "stop" is boldly painted as a more effective means of stopping a vehicle than the old-time cloth flag, which has been misinterpreted on some occasions.

Another feature of the safety measures in addition to the flags and crossing bells is the placing of warning signs either side of the right-of-way at all crossings except those equipped with gates. On the east side, and 300 ft. from the track, a large round iron sign painted red, with the printing cast in raised letters and silvered to reflect the light from automobile headlights, is mounted on a steel post set in concrete and reads "Railroad Crossing 300 Ft." The right-of-way is paralleled on the west side by the Chicago & North Western Railway, with only a narrow strip between these tracks and those of the electric line. In order to give added warning to traffic approaching the electric right-of-way from across the steam tracks, a round warning sign similar





NORTH SHORE GRADE-CROSSING PROTECTION—AUTOMATIC WIG-WAG SIGNAL AND SIGN INSTALLED AT CROSSING AND WARNING SIGNAL INSTALLED 300 FT. AWAY

to the 300-ft. sign is placed at the electric right-of-way, reading "Railroad Crossing, Danger."

The wigwag signals installed are the auto-flags furnished by the Bryant Zinc Company, Chicago. They are equipped with a combination of three warnings, the swinging disk, the red light in the center of the disk and the electric bell, each of which operates independently of the others. The wigwag is motor driven by a 600-volt motor and the signal is controlled from a track box designed by the engineering department of the railway company. These track boxes are built for high-speed operation, and while a few failures have been registered in snowy weather, these failures have always been on the side of safety—that is, the signal was not cut off and kept on operating continuously. The track boxes are located to give a thirty-second warning in advance of the cars, and this has governed the installation from 2400 ft. from the crossing, where the speed is 60 m.p.h., to 1400 ft., where the trains approach slowly. An indication lamp is placed 200 ft. from the starting box which tells the motorman the wigwag is working. There is also a green lens on each side of the wigwag light cylinder which serves the same purpose.

All signals are set in concrete and the posts painted black and the disk red. The crossing gates are set on creosoted wood posts and painted red and white in alternate stripes.

Other work done in the general move to eliminate the crossing accidents included the clearing away of shrubbery and weeds, trimming of trees, moving of stations in a few instances and generally cleaning up a triangular space each way from the crossing of all obstructions to the clear view of the motorman or the driver of a crossing vehicle. In some instances this clean-up program met with great opposition, but generally by telling the owners the purposes of the move, it was possible to gain their permission to pull up good shrubbery. The crossing planks were rebuilt in many instances and filled in with crushed stone and planks laid the full width of the road, instead of the customary one set in the middle, to eliminate the possibility of an automobile becoming stalled on account of the irregularity in the roadbed at the crossing.

The maintenance on the various crossing protection devices and the labor charge for twenty-four-hour flagman service on this 33-mile southern section of the Milwaukee line adds about $35,000 a year to the operating expenses of the company. With the installation, during the coming spring, of twelve more gates and twelve more auto-flags on the remaining north section of the line, this operating expense for protecting crossings will be approximately $45,000 annually.

Snow-Fighting Organization in Denver

System Developed to Cope with Heavy Snowfalls—Whole Personnel of Tramway Can Be Used if Necessary

IN common with other railways operating in climates in which heavy snowfalls are frequent, the Denver Tramway has developed schemes for preventing interruption to traffic based upon immediate action coincident with the beginning of a storm. On this property the first action taken depends upon prevailing conditions, viz., time of year, hour with reference to peak load of traffic, condition of the ground, quality of snow, accompanying wind and probable duration of storm as reported by the Weather Bureau. The different departments plan their activities after considering the above conditions.

In the event of an ordinary snowstorm in mid-winter, men of the track department first clean and salt all switches in operation. If the storm begins at night the dispatchers first notify the heads of departments and foremen at their homes. The transportation department has men assigned to each sweeper, and these crews take the sweepers out before the regular track men can be called. If the men of these crews are taken from their regular runs extra men are substituted, or if they are not working they are notified by telephone or by messenger. Each crew proceeds to put its particular sweeper into good working condition by inspecting brooms and seeing that machinery is well lubricated. The dispatcher, being informed by the several car crews or inspectors as to trouble with snow on certain lines, reports to the superintendent, who orders out the sweepers. The transportation department has charge of the operation of all sweepers and plows.

A crew and relief crew each consists of four trainmen. The shops send a man to assist with large plows and to observe their action under working conditions. The dispatcher orders sweepers to follow regular routes, according to one of several predetermined plans which are designated by letters. Plan A outlines the routes of four sweepers for cleaning up the paved streets in the four main divisions of the city. Plan B directs the work of six sweepers sent out to clean up the entire system. Plan C specifies the routes in all sections of the city for all sweepers and plows owned by the company when ordered out during a more severe storm. Plan D is resorted to as the lines cease operating and a partial or complete tie-up seems unavoidable. It urges concentration of the equipment on one line which serves a large portion of the traveling public and gives access to the shops. In this circumstance continuous operation is not attempted, and cars are taken in so as not to hinder the snow-fighting equipment. Plan E, used in conjunction with plan C, gives a schedule of routing plow-cars for "winging" out snow after a heavy storm, each plow to be followed by a sweeper and a car with men from the track department to clean switches. Plan F gives the route and names of men in the crew and relief crew for each sweeper and plow.

Whenever operation is suspended due to an extra heavy fall of snow, six main arteries are opened first to give a basis of operation and to provide partial service for each portion of the city until the situation can be further relieved. The snow-fighting organization then consists of fourteen gangs, each following a predetermined schedule and composed of foreman, sub-foreman, timekeeper, waterboy, 100 laborers, sweeper and four-motor car for men and tools. A team and plow is used if at all advantageous. Four gangs are made up of trainmen from the four transportation divisions, while those remaining consist of men from the track department reinforced to the extent of 1,000 men from any available source. The timekeepers assign tools, make out daily payroll proration sheets, and provide for identification and transportation of the men. The car with each gang affords a portable shelter, and food is either provided for the men on the job or the men are fed at restaurants.

All work is directed by the planning bureau, which co-operates with the foremen, employment bureau and purchasing agent. It sees that the routes named in the plans mentioned above are followed as closely as practicable and attends to the deliveries of salt and car sand and the distribution of equipment, tools and men.

For the three years ended Dec. 31, 1916, the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, carried 147,040,186 passengers, a total distance of 22,415,077 miles, without a death or fatal injury in transit.

Companies' Attitude on Strike Restriction

New York Lines Doubt Effectiveness of Commission Plan for Providing Fair Wages and Preventing Service Interruption

IN connection with a general account of hearings before the Public Service Commission for the First District of New York on its tentative strike restriction plan for electric railways in New York City, the ELECTRIC RAILWAY JOURNAL of Feb. 10 mentioned in brief the objections raised by railway representatives at a meeting on Feb. 8. Before noting in this issue the comments of other representatives at later hearings, it will undoubtedly be of interest to describe in more detail the attitude of the railways in New York toward the commission plan, the text of which was published in the issue of Jan. 27.

MR. MAHER'S STATEMENT

The only official of the leading city companies who was able to attend the hearing was E. A. Maher, Sr., president Third Avenue Railway. Mr. Maher's opinion of the proposed plan was expressed in a previously prepared statement which was in part as follows:

"Any interference with service in the nature of a strike must necessarily cause all three of the parties involved, the public, the employer and the employee, to suffer, so that it is practically needless for us to say that we are interested in any legislation that will remove the possibility of, or make less likely the occurrence of, a strike. We are heartily in favor of some method of collective bargaining between the employees and the corporation. We do not believe, however, that any method which necessitates bringing into the situation, interests and individuals outside of the regular body of employees would result satisfactorily. The dealings should be directly between the men and the company, and no interests outside of the men, the company and the public should be permitted to intervene.

"We have within our organization a Mutual Benefit Association, in which practically 100 per cent of our employees are members. We also have a plan of life and accident insurance system which covers practically 80 per cent of our employees. We also have a pension system which applies to all of the employees. It is our present purpose to broaden the scope of our mutual benefit association, so that its members in the various divisions of the company will elect their own representatives to take up with the management any question affecting wages and working conditions and looking to the improvement of the service and the satisfaction of the demands of the public and of the employees. We believe that such an organization within the company, properly administered, would practically eliminate strikes and internal dissension between the men and the company. We are firmly convinced that any plan which left to any bodies outside of the organization the question of adjustment of differences, would not successfully work out.

"We are in favor of employees entering into contractual relations with the company, and the contract should specifically set forth the terms of employment and of working conditions. We believe such contract should be for a stated period of time, that necessarily it should be binding upon both parties thereto, and that there should be a proper penalty enforceable for the violation by either of the parties. All questions of discipline and efficiency should rest entirely with the employer. The employee should have every opportunity of presenting a full and complete defense to any charge that may be filed against him and to have a fair hearing and a just decision. This could be done within the organization itself and without the intervention of outside parties, for it is needless to say that no corporation wants to dispense with the services of a competent, capable employee, so long as there is room for his employment in the services. We believe that the experience of the Philadelphia Rapid Transit Company with its employees, extending over a period of more than five years, conclusively demonstrates the possibility of settling all differences that may arise between employer and employee in a public service corporation, in a manner that is entirely satisfactory to the public, the employer and the employee."

COLONEL WILLIAMS' STATEMENT

T. S. Williams, president Brooklyn Rapid Transit Company, and T. P. Shonts, president Interborough Rapid Transit Company and New York Railways, were both unable to be present at the hearing but sent written communications giving their views. Mr. Williams said that he appreciated the motive of the commission in seeking to prevent interruption of service by reason of dissatisfaction with wages and working conditions, but he did not agree that the ends aimed at could best be accomplished by law or that such legislation as proposed would be either practicable or beneficial. On the other hand, he feared that it would be productive of unrest and dissatisfaction, tending to disturb relations which are now harmonious and fairly satisfactory.

Continuing, Mr. Williams said in part:

"If there were substantial reasons for expecting that your plan would preserve continuity of service in case of labor disputes, we would all, I think, be disposed to waive minor differences of opinion. But it seems to have been conceded that at best the proposed legislation could only serve as a moral argument against strikes, and that there would be no way of enforcing among workers observance of a labor decision, although the power of the commission over railroad corporations could be exercised to compel obedience from the corporations. This admission, it seems to me, puts us no farther forward than we are to-day, and if continuity of service cannot be secured with reasonable certainty from the plan, its other features would probably not be seriously put forth and are in their general scope too radical and objectionable to warrant favorable consideration.

"My own conviction is very strong that such problems must be solved not by law but by intelligent and fair co-operation. No legislative reforms are likely to be so abortive as those which have to do with the delicate relations between labor and capital, and which on the one side may threaten fundamental principles of individual freedom, and on the other side imperil or unnecessarily shackle business and industry. The better and surer way to correct industrial evils is by encouraging a more enlightened comprehension of respective self-interest between employed and employers. At no time in the world's history has the necessity for this mutual sympathy and co-operation been so generally recognized as it is to-day. Inequalities and adverse conditions exist, and perhaps always will, but the force and

power of an educated public sentiment, finding sympathetic and practical response both from those who toil and from those who invest, will have more influence in securing substantial equity than any law—and such a response will be the most effective insurance to the public against the evils in interruptions of transportation and industry which follow misunderstandings and discord.

"Every reasonable investor knows that his investment in a public service corporation cannot be on a sound and permanently productive basis unless the workers, whom his money hires, and the public, which his facilities serve, are reasonably satisfied. Every sensible employee likewise knows that the permanence, conditions and emoluments of his employment depend primarily upon the continuance of investment and upon satisfaction with its return. And the public knows that its comfort and convenience are best subserved when both investor and worker are reasonably satisfied with their respective participation in the products of their joint undertaking. General recognition of this common interest may be slow in coming, and in the meanwhile there may be regretful clashes, but if the principle is sound it will ultimately be triumphant.

"Your plan, on the other hand, presupposes not natural and spontaneous harmony between these participants, but antagonism and the doubtful peace sought to be inforced by law or official fiat. The other plan assumes mutual interest, presupposes honest purpose and encourages intelligent co-operation. From neither plan would its advocate expect that a Utopia could be developed at once. Your plan may look like the short route to industrial peace, but it is not the natural or safe or permanent route, nor is it founded on a sound principle. In its practical application it would tend to breed trouble, not to allay it.

"The principles outlined above have been put into practical effect on the Brooklyn Rapid Transit System. They received a severe test in the surrounding labor disturbances of last summer, and they stood that test well. Had the plan which you now recommend been then in force we would probably have had dissatisfaction and disturbance. Instead there was mutual confidence, loyalty to the enterprise, enthusiastic co-operation and, of course, no interruption to service. We have a splendid body of men who are trying in their own way, and, I think, the right way, to solve these difficult problems, and we ask that they be left alone to solve them in that way as long as it is satisfactory to them and insures public comfort."

Mr. Shonts' Statement

In criticising the proposed plan, Mr. Shonts made a statement in part as follows:

"We recognize these points:

"1. The supremacy of the public interest in uninterrupted and efficient transportation service.

"2. The principle of collective bargaining for the purpose of securing fair and reasonable wages and working conditions, and also the principle of definite periods of employment.

"3. The necessity for an impartial tribunal with power to enforce its decisions in labor disputes.

"4. The necessity for such a change in the law as will insure uninterrupted service pending investigation by such a tribunal, and thereafter continuous service in accordance with its decision.

"5. The necessity for leaving with the employer the maintenance of discipline and efficiency, including the right to discharge for good cause, but with the right of a discharged employee to have a written statement of the cause of his discharge delivered at the time thereof.

"6. The right of an individual employee to leave the service before the expiration of the agreed period with the written consent of the employer, or, if such consent be refused, that the Public Service Commission may, for good cause shown, make an order which shall be in lieu of such consent.

"We do not believe, however, in your plan for the organization of employees or for a wage board, or that your commission should have the power to determine wages, salaries or working conditions, or to adjust grievances.

"We believe that it is against the public interest that the employees of the transportation lines in this city should be affiliated with labor unions which, to win their strikes in other trades or in other cities, may put this city to the detriment of a sympathetic strike. We believe that the plan or an organization which our own employees adopted last year is more in the public interest, as well as their own, and that their method of collective bargaining is more truly representative of the employees than your proposed wage board. Each class of employees has proportional representation, and the terms negotiated are submitted for individual approval so that no employee may be bound except of his own free will.

"Then the law should provide that no employee should leave the service except by consent as above mentioned. If any considerable number give written notice of intention to quit or to demand changed conditions or wages, or if the employer gives written notice of an intention to change wages or conditions, let the Public Service Commission forthwith ask the Appellate Division to appoint three arbitrators to determine the controversy, giving the commission the right to appear on behalf of the public. The decision, when confirmed by the Appellate Division, should be binding for a period of from one to three years. This plan insures an impartial judicial tribunal to pass upon the rights of the public, the employees and the employer, and prevents the Public Service Commission from being both prosecutor and judge, which is abhorrent to all systems of government. Let the law also impose severe penalties upon both employer and employee for a breach of the decision so made.

"As to our fourth objection—to your taking up the adjustment of grievances—we believe that these matters can better be left to the employees' own organization in conference with the officers of the employer as provided by our own brotherhood rules, which have been approved by our directors. The interposition of any outside body in the adjustment of ordinary grievances will not make for harmony and co-operation, but will tend to create a spirit of contention and insubordination."

Further Hearings

The hearings before the commission were continued on Feb. 13 and Feb. 15. Those who were heard included Deputy Attorney General Merton E. Lewis; Everett P. Wheeler, representing the committee on industrial arbitration of the New York Reform Club; Pauline Goldmark of the National Consumers' League, and J. A. Fitch of the staff of *The Survey*. Mr. Lewis favored contracts of service for utility employees, with criminal punishment for breach by either party. He thought, however, that the easiest way to settle industrial disputes would be to confer this power upon the courts. The Attorney General should apply to the Appellate Division for arbitrators, whose decision should be reviewed by the court. Mr. Wheeler favored civil penalties rather than criminal, and the carrying out of awards under the supervision of the commission. Miss

Goldmark stated that the public should enter negotiations from the first step. She believed that utility employees should be guaranteed higher wages than those in private employment. Mr. Fitch said that standards of bargaining should be created and that an investigating body should be organized to get the facts without going so far as to restrict the right to strike. He thought that there should be no public supervision of mutual agreements or settlements between employer and employees unless either side or the public should appeal. Furthermore, he thought that rate bodies should not pass on wages, but that a separate body should be organized.

Capacity of Cast-Iron Car Wheels*

The Author Analyzes the Elements of Weight and Cost, and Advocates Increased Flange Thickness for Heavy Service

BY GEORGE W. LYNDON
President, Association of Manufacturers of Chilled Car Wheels.

IN the year 1904, the 700-lb. chilled-iron car wheel as used under 50-ton cars was recommended as standard by the Master Car Builders' Association, and with a subsequent modification increasing the weight to 725 lb., it was formally made standard in 1909. During the time intervening the rolled-steel wheel was introduced, and notwithstanding the alleged superiority of this metal, the new wheel weighed a minimum of 750 lb.

Since the year 1875, the great capacity of cars and the tremendous tonnage hauled has called for an increase in the weight of the car structure from 18,000 lb. to 65,000 lb., or an addition of 260 per cent, an increase in the weight of rail of 150 per cent and an increase in the axle of 200 per cent. Yet the weight of the wheel has increased only from 525 lb. to 725 lb., or 38 per cent.

While the chilled-iron wheel has always met increases in the capacity of the cars, one part of the wheel has received scant consideration and that is the flange. This is due, perhaps, to the fact that, during all the remarkable railroad development of the past forty years, the space between the running rail and guard rail has remained fixed at 1¾ in.

For years the chilled-iron wheel manufacturers have been trying to secure a stronger flange and have demonstrated the fact that 3/16 in. can be added to the thickness of the present M. C. B. standard. Compensation for the increase may be made by mounting each wheel 3/32 in. closer to the rail so as to maintain the M. C. B. standard dimension of 4 ft. 6 29/64 in. from back to back of flanges. This insures that the relation of the back of the flange to guard rail remains the same as at present and no change in track clearance is required. There can, therefore, be no objection from a track standpoint of making a liberal increase in the present flange thickness and the plan has received approval from a special committee of the American Railway Engineering Association.

Under 70-ton cars the load per wheel amounts to about 25,000 lb., and this requires almost 20,000 lb. flange pressure to change the direction of the truck. Therefore, with present conditions of operation, considering the increased speed, the thrust on the flange including impact is at least ten times greater than under the old 10-ton cars of 1850, and it must be apparent that the increased flange duty has not been provided for.

The Association of Manufacturers of Chilled Car Wheels believes that, because of the general conditions confronting us to-day and the need for a safety factor of operation, three designs of wheels with 3/16 in. increase in flange, would in a great measure solve the present troubles. Its recommendations for the three wheel sizes are as follows:

Weight of Wheel	Maximum Gross Load on Car
675 lb.	112,000 lb.
750 lb.	161,000 lb.
850 lb.	210,000 lb.

With regard to cost it may be said that about 30 per cent of all wheels sold are removed by foreign lines and the prices paid for these removals are fixed by the printed interchange rules of the Master Car Builders' Association, as follows:

	Chilled-Iron	Steel
New value, each	$9.00	$19.50
Scrap value, each	4.75	4.50
Net cost	$4.25	$15.00
Cost of removing from and replacing in trucks, per pair $2.25, each	1.12	1.12
Cost under car, each	$5.37	$16.12
Cost of two turnings	....	3.25
Total cost of wheel service, each	$5.37	$19.37

It will be observed that the total cost for wheel service for steel wheels is about four times that of the chilled-iron wheel, and upon this basis of comparison any substitute must yield four times the mileage or time service in order to equalize the cost. All chilled-iron wheels are guaranteed for a standard minimum period of service, and should any wheels fail in service through the fault of the manufacturer a new wheel is supplied without any cost to the user. Hence, the maximum net cost per year ranges from 52 cents to 90 cents depending on the size.

Any wheel that is sold for $20 will cost the railroad in interest charges alone (figured at 5 per cent per annum), more than the renewal charges of the chilled-iron wheel, because while the guaranteed net cost to the railroads is based upon six, five or four years' service respectively, the actual service is often twice as much.

During the two years last past, the price of all commodities have reached their highest figures. Nevertheless the price of the chilled-iron car wheel has practically remained constant.

In conclusion it may be said that the capacity of the chilled-iron car wheel has not yet been reached, and today there are in service wheels weighing 950 lb., or 225 lb. heavier than the heaviest present M. C. B. standard. These wheels are carrying a burden of 26,500 lb. per wheel and they have given such satisfactory service under engine tenders of 12,000 gal. capacity that no other type of wheel is considered by the user.

An additional weight of 25 lb. per wheel because of thicker flanges would not appreciably increase the tonnage, but this addition of metal would materially increase the factor of safety. If all wheel renewals in the country based upon 2,500,000 annual renewals, were increased in weight 25 lb. each, the total increased tonnage to be purchased would be 31,250 tons at $10 per ton differential, making a total additional expenditure of $312,500 annually.

*Abstract of an address before the Canadian Railway Club at Montreal, Canada, Feb. 13, 1917.

At the January, 1917, meeting of the New York Railroad Club a paper was presented by Marcus A. Dow, general safety agent New York Central Lines. This contains the results of a comprehensive analysis of the subject. In conclusion Mr. Dow stated among other things that "the railroad or industrial official who will concentrate his energies and faculties to at least a reasonable degree upon the prevention of accidents is bound to attain success in that direction just as surely as he is bound to attain success in the efficient handling of any other phase of transportation. The first thing necessary is to formulate definite plans, and the next is consistently and continuously to work such plans."

Practical and Economical Solutions of Problems in

EQUIPMENT AND ITS MAINTENANCE

Milwaukee Center-Entrance Car Designed for Train Operation—European and American Practice in Setting Trolley Poles—Open Car for Winter Service in Boston, Mass.—New Electric Railway Equipment

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Center-Entrance Cars for Milwaukee

New 50-Ft. Cars Retain Company's Former Wheel and Motor Standards But Have Low Center-Step Arrangement, Large Seating Capacity and Other New Features of Body Design

A radical departure from previous designs has been adopted by the Milwaukee Electric Railway & Light Company in the fifty new cars that have recently been placed in its city service. The new features include the center entrance and exit with front exit also, the use of multiple-unit control for train operation, and the installation of maximum-traction trucks. However, the company's standard three-wear, 34-in. driving wheel has been retained, and also the standard 70-hp. Westinghouse 306-CA-2 motor. The economy, from the maintenance point of view, of adhering to previous standards, and the rather severe service requirements for which these cars have been designed, were considered to be of sufficient importance to warrant sacrificing the advantages of the low floor. However, the ease of entrance and exit has been greatly facilitated by the well and step arrangement that has been used.

The design was controlled largely by the decision to operate the cars in two-car and three-car trains. During the morning and evening rush-hour service they will be operated in two-car trains, but it is planned to operate them in three-car trains on the long suburban lines to the parks outside of Milwaukee on days of especially heavy traffic. Under these conditions it was considered that the best location for the conductor would be at the center of the car. Also, the long runs require rather high speed, and with the heavy loads carried, it was considered essential to have a large motor. Accordingly the company's previous standard motor was utilized, and the advantages of the maximum traction truck added to it for the first time in Milwaukee.

The service requirements which the electrical equipment was designed to meet are summarized in the following table:

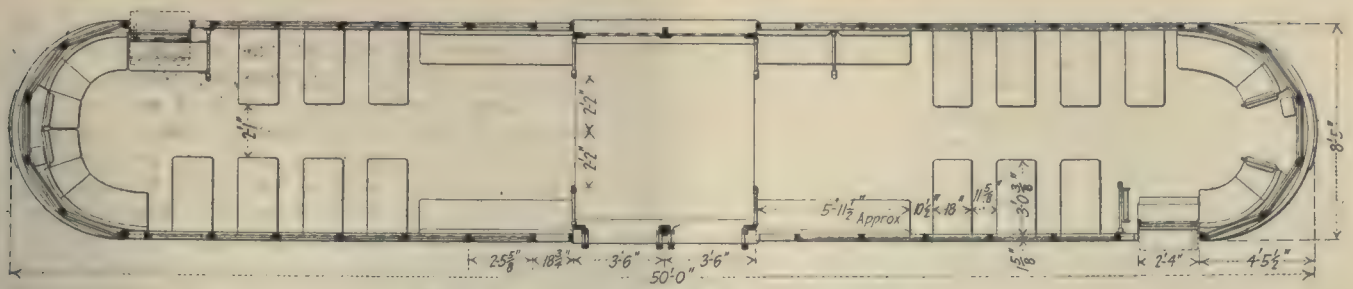
SERVICE SPECIFICATIONS FOR ELECTRICAL EQUIPMENT

Seating capacity	60
Capacity (with standing load figured on 4 sq. ft. basis)	115
Length of car over-all	50 ft.
Distance between bolsters	28 ft.
Width of car body over belt rail	8 ft. 5 in.
Weight of empty car and trucks (without electrical equipment or live load, max.)	36,000 lb.
Line potential:	
Maximum	600 volts
Minimum	400 volts
Average	500 volts
Total distance round trip	17.9 miles
Running time	106 min.
Schedule speed	10.15 m.p.h.
Stops per mile	7
Average duration of stop	6½ seconds
Wheel diameter:	
Drivers	34 in.
Idlers	22 in.

Multiple-unit operation is provided for by the use of Westinghouse H.L.D. control. This is a combination of pneumatic switch units and cylinder control, which has 600 volts on two fingers, but has the main control circuit operated at 110 volts. Automatic acceleration is provided, and in order to increase the speed of accelera-



INTERIOR VIEW OF MILWAUKEE CAR SHOWING MOTORMAN'S CAB; EXTERIOR VIEW OF CAR



FLOOR PLAN OF MILWAUKEE CENTER-ENTRANCE CAR

tion on heavy grades where it would be unduly slow with the automatic control, a push button is installed at the motorman's position by means of which he can gain manual control of the acceleration. This button is placed in an inconvenient place so that the motorman will not be inclined to use it when starting under normal conditions.

CAR-BODY ARRANGEMENT AND DETAILS

The feature of the car body design is the arrangement of floor ramp, well and entrance steps which divide the distance between rail and car floor in such a way as to make for easy entrance. The center well is reached by a single stationary step, above which the entrance and exit doors operate. Between the center well and the main body of the car there is a low step. From this point to the bolster of the car, a distance of approximately 10 ft., there is a ramp of 6 in. At the front exit door, which is made 28 in. wide, there are two steps, one of them stationary and the other of a folding type, that is operated in conjunction with the doors. The various step heights are as follows:

Top of rail to center step	14 in.
Step to well or vestibule floor	10 in.
Well floor to car floor	8 in.
Top of rail to front exit first step	15 in.
Second step	12 in.
Second step to car floor	12 in.

The pay-as-you-enter railings, etc., are so arranged that the conductor can stand in the middle of the well facing the entrance doors, which give two openings approximately 2 ft. 10 in. wide, and from this point he controls the movement and collects fares of passengers going to the front or to the rear of the car. The construction is such that it may readily be adapted to a combination pay-as-you-enter, pay-as-you-leave scheme, provided the company later decides to depart from the regular pay-as-you-enter practice in use at present in Milwaukee. The entrance and exit doors are controlled by two levers on the stanchion in front of the conductor's position. A light-signal connected with the doors gives the motorman the go-ahead indication, and ordinary stop signals are given by the passengers through buzzers or through a button placed in front of the conductor. Emergency stop signals are given by a single stroke bell operated from a push button which is installed on the center post between doors behind the conductor's position. It is placed in this position behind him so that it will be used only for emergency purposes, and one stroke of this bell is to be understood as an emergency stop signal to the motorman.

The car underframe is made up very largely of pressed-steel members with a few structural shapes. The superstructure is very largely of steel, but with end posts of wood in order to minimize the cost of repairs. Steel or composite board finish is used throughout the interior, and the cars are built with a double-wooden floor with insulating material between to cope with the winter heating problem. For this same reason an air space between the outside steel plates and the inside sheeting, and between the car roof and the composition board headlining is provided. This construction, of course, adds to the weight of the car, but is considered essential in the Wisconsin climate.

Fourteen Walk-over rattan-covered cross seats have been installed, together with four longitudinal seats adjacent to the center well, circular end seats in the ends of the car and a folding seat at each end-exit door. All seat cushions and backs are of the springless, sanitary type. The seating capacity of the car is fifty-six, but this is increased to sixty in the second and third car in a train by the two seats which fold up into the space occupied by the motorman and by the folding seats across the front exit, which will seat two passengers.

At the ends of the car the arrangement of the motorman's control equipment is ingeniously worked out so that practically no space is sacrificed when the control equipment is not in use. The two seats at the end of the car fold down by simply kicking the supports from beneath them, and two glass panelled doors forming the backs to these two seats open up to a position parallel with the length of the car and form an operating cab for the motorman. These doors lock in position, both closed and open, and serve when closed to protect the clothes of passengers from coming in contact with any grease which might be on the apparatus, and also to conceal the equipment and prevent passengers from meddling with any of it. The cab is converted for rear-end use by merely closing the doors to a position parallel with the end windows and raising the folding seats.

The car lighting includes the use of selector switches which control two series of 56-watt lamps equipped with reflectors. A special 23-watt circuit provides illumination for the hood destination signs and headlights, the side route signs being illuminated from the general interior car lighting. Ventilation is accomplished through the use of twelve exhaust-type ventilators placed symmetrically with six each side of the well, which are used in conjunction with the forced hot-air heating system.

The possibilities toward producing a car of light weight were somewhat curtailed by the limitations made necessary by the sixty-passenger capacity of the car, the heavy service requirements and the special construction against cold. A summary of the various weights is detailed below.

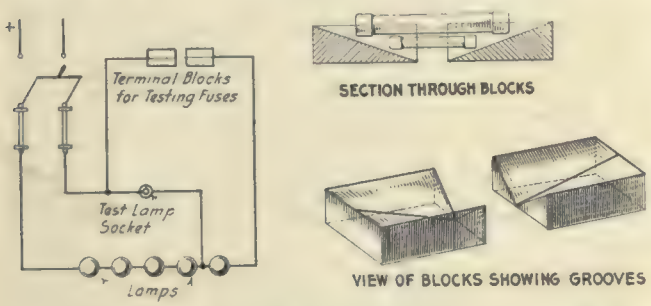
	Pounds
Motors	5,500
Electrical equipment	2,423
Truck, less motors	11,686
Air brake equipment	1,195
Heater equipment	495
Hand brake equipment	305
Sander equipment	111
Fenders	200
Draft rigging	820
Fare boxes	20
Signal bells	5
Signs and sign equipment	200
Miscellaneous equipment	91
Seating apparatus	1,350
Vestibule equipment	576
Door operating devices and door equipment	1,060
Window and window trimmings	873
Roof	2,034
Underframe	7,534
Sideframe	2 339
Miscellaneous equipment	2,921
Miscellaneous body details	262
Total	42,000

Special Contact Blocks for Testing Fuses

BY R. H. PARSONS
Electrical Foreman

A great saving in time is made possible by the use of special apparatus in connection with the common method of testing lamps and fuses.

In the ELECTRIC RAILWAY JOURNAL for Sept. 9, 1916, page 455, a test board with special fuse and lamp testing appliances was described, and another type of device that may be used for the same purpose is a special terminal block to make contact with the fuse under test. The blocks have slanting V-grooves, as shown in the



PROTECTIVE CONTACT BLOCKS FOR TESTING FUSES OF VARIOUS LENGTHS

accompanying drawing, to accommodate fuses of various sizes and also to protect the operator from electrical contact. Two blocks are so placed in the testing circuit that the smallest fuse can just span the distance between them. A larger fuse makes contact nearer the opposite ends of the blocks and its middle point, or the operator's hand, is remote from the bottom of the groove, thus insuring greater safety.

The terminal blocks and an old style, threadless socket, into which test lamps can be quickly pressed, are mounted on a slate base with the other testing apparatus. This equipment, if placed near the inspection or repair track for the use of the men working on cars, is very convenient.

Should Trolley Poles Be Set with a Rake?

BY J. G. KOPPEL
Electrical Superintendent of Bridges,
Sault Ste. Marie, Mich.

It is a well-known fact that many roads which use electric power for propulsion are building their overhead lines by setting the trolley poles with a certain rake, from 6 in. up to 2 ft. It seems to me that a line constructed with poles set with a rake gives a very poor impression. Such a line, even if new, always has the appearance of being thirty or more years old.

I saw the first street railway line built with poles set with a rake in London, England. These poles were all of good design and made of cast steel with cast-iron bases. The rake was about 6 in., and the poles were set without guy wires. A line built like that spoils the good appearance of the street, because we know that, no matter what we are building, the plumb-line, the square and the level are the three devices by which the construction is governed. Up to the present time human beings are accustomed always to see things looking straight, one way or the other, that is, either vertical or horizontal.

Going back to the English tramway line I will state that the English firm which built this line also built a tramway system at St. Petersburg, Russia, but the Russian engineers objected to the construction of a raked pole line, and the poles were, therefore, erected vertical. These have carried their load well and are still standing upright. Two other tramway lines were built, one at Riga and the other at Libau, by a German firm. The poles were built up from two U-irons with flat iron riveted in the centers, and all poles were set vertical on single and double-track lines.

A few weeks ago I happened to be in Montreal, Canada, where I noticed that the Montreal Tramway uses steel tubular poles set with a rake from 6 in. to 8 in. The impression made by the raked poles between straight buildings and vertical lighting poles was, upon me, very unfavorable. Further, on the Chicago, Milwaukee & St. Paul electrification I notice that guyed poles set with a rake are used.

In view of the difference between European and American practice in this matter, I wish to raise the question, among those who have had more experience in pole setting than I have had, as to what real advantage is to be gained by setting guyed poles with a rake. Will guyed poles set with a rake stand more load under ordinary conditions than guyed but vertical-set poles?

My opinion is that the present practice of raking poles is largely the result of blindly following precedents established in the early days of pole-line construction. It may be that the practice was developed for the purpose of covering up poor workmanship, so that by giving a pole a sufficient rake an observer cannot tell whether it had pulled over since it was set or whether it was originally set as seen. It seems to me, therefore, that it would be better to follow European practice because of the better impression that this type of construction makes upon the traveling public.

[NOTE.—In this connection the following quotations from a paper entitled "A Civic Duty for Engineers," by S. E. Doane, chief engineer National Lamp Works General Electric Company, delivered before the Cleveland Engineering Society, is of interest:

"It is still a frequent practice in this country to have the trolley poles leaning away from the pull of the cross-wires (and incidentally in some other directions, too). I have always wondered whether this was really necessary or whether it was being done just because it had always been done that way. I know now that this is not being done in Europe or rather that the poles are being put up with an over-leaning just large enough that they are pulled into the exact vertical when the tensional stress of the span wire comes on. I know that at least one of the largest firms there constructing electric railroads has provided tables to show how much their standard tubular steel poles will bend under the normal stress to which they are subjected. * * * To judge from appearances the same systematic method is followed with wooden poles."

The A. E. R. E. A. Engineering Manual, Ds 2b, specifies as follows:

"18. Wood poles with brackets shall in general have a rake from the track of 6 in. in 24 ft.; steel poles with brackets of 3 in. in 24 ft.

"Wood poles with spans shall have a rake from the track of 12 in. in 24 ft.; steel poles with spans shall have a rake from the track of 6 in. in 24 ft.

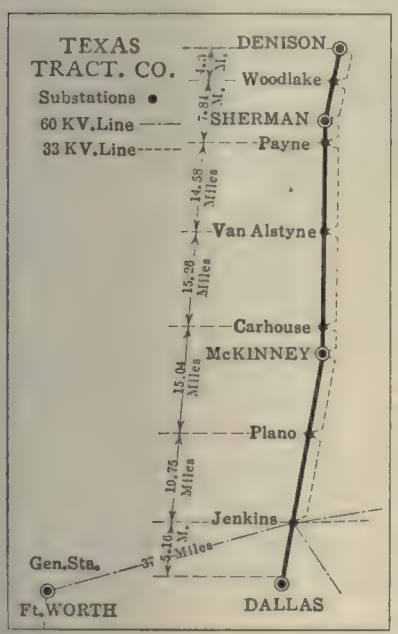
"When the strain is from the track, as with poles on the inside of a curve, raked poles, or head guys shall be used and standard rakes maintained.

"Double-bracket poles shall be set without rake; other poles between tracks, and poles under outside jurisdiction may be so set if necessary or required."—EDS.]

Overcoming Starting Troubles with 60-Cycle Converters on a Long Transmission Line

BY H. L. INGRAM
Superintendent of Substations Texas Traction Company, Dallas, Tex.

The principal trouble we have experienced with the 60-cycle rotary converter has been in starting. All units are started from the alternating current end as induction motors. When first installed, they were equipped with double-pole double-throw switches with rheostats in two lines for limiting the starting current supplied from the half-voltage transformer taps. These rotaries are all of the six-pole type. It was found if the circumference of each armature was divided into twelve equal parts and the proper points of division selected, that there would be six positions where the converter would start when the power was applied and six positions where it would not start. This at times caused damage to the commutators, collector rings and switches. The disturbance has been attributed to the unbalancing of the phases by having the rheostats in only the two lines. Hence the new installation at our Payne substation was equipped with triple-pole double-throw switches and a rheostat in each line, with the result that these converters will start from any position with much less sparking at all the direct-current brushes.



MAP SHOWING LOCATION OF POWER-HOUSE, SUBSTATIONS AND TRANSMISSION LINES, TEXAS TRACTION COMPANY

In starting up the machines, they are brought up to speed on the half-voltage taps and the field break-up switch is closed with the proper polarity on the direct-current side and then the double-throw switch thrown over in the full-voltage position. This method of starting had given entire satisfaction with the 25-cycle converters, but with the 60-cycle machines, when the change was made from half to full voltage, it was frequently accompanied by flash-overs, tripping of oil switches where the relay was set for as much as 400 per cent normal current and other troubles. It was found that a very few seconds after the machines had come up to full speed on the half-voltage taps and the field break-up switch had been closed, that they "hunted" badly, and this made it practically impossible to throw over to full-voltage conditions. This performance is more marked in the 200-kw. units than in the 300-kw. units and increases as the distance from the generating station increases and the load on the high-tension line decreases. The operators have become accustomed to this condition and have succeeded in getting good results by using a different field strength for each station and making the change before the converter starts hunting.

On a temporary installation at the Payne substation, transformers without half-voltage taps were used and the converter was started from full voltage by using a correspondingly increased resistance. While this was a make-shift arrangement, it gave excellent results, and no trouble was experienced in throwing from the resistance leads to full voltage at any time. It is the writer's belief that if a switch were provided with which to short-circuit the starting resistance, hunting on the half-voltage taps would be practically eliminated. We are having no trouble from line fluctuations, except at Jenkins' substation, where an occasional heavy surge on the 60,000-volt line will cause a flash-over. No remedy for this trouble has been found so far, but all things considered, we are realizing excellent results from a standpoint of maintenance and operation.

The Texas Traction Company in June, 1915, discontinued the generation of power at 25 cycles and 19,100 volts, to take advantage of a power contract with the Texas Power & Light Company, which now supplies current at 60 cycles and 33,000 volts to five of the traction company's substations. Another substation at Jenkins, is supplied with energy at 60,000 volts. While the company was generating its own energy at 25 cycles frequency, each of these six substations was equipped with one 300-kw. rotary converter. These were displaced, when the company began to purchase 60-cycle power, by one 300-kw. unit in each of three of the stations, and two 200-kw. units in each of the remaining three. This arrangement was installed in view of the plan to ultimately operate the portion of the line south of Sherman at 1200 volts direct current and abandon the substations at Plano and Van Alstyne.

With the 25-cycle system, the substation farthest from the power house was served by a 35-mile transmission line, while under the present arrangement with purchased 60-cycle power, the most distant substation is 95 miles from the generating station. This, incidentally, is the longest transmission line in the country serving 60-cycle converters. The writer is also in charge of six substations for the Southern Traction Company, which operates south of Dallas at 1200 volts direct current supplied from motor-generator sets, and finds that the 60-cycle converters are just as dependable and have the increased efficiency in their favor.

Protecting Cables in Manholes

The Composite Metal Lath Company, New York City, has just developed a method of wrapping the cable with a mesh of steel wire upon which ordinary brick or terra cotta has been baked. The accompanying illustration shows a 2½-in. feeder on which the brick lath is used as a base for a protecting coat of sand and cement.



FEEDER CABLE PROTECTED BY METAL LATH COVERING

This covering is made up in large sheets 40 in. wide by 16 ft. long. It is usually cut in strips about 3 in. wide and wound spirally about the cable to be protected. A mixture of two parts sand to one part Portland cement is then wiped on by hand to a thickness of about ⅝ in. This covering can easily be applied in manholes or other confined places. It is claimed that this material is less expensive than an asbestos or rope base. Other methods of fireproofing cables in manholes were described by Albert F. Hovey in the ELECTRIC RAILWAY JOURNAL for Nov. 18, 1916, page 1068.

Open Car Equipped for Winter Service as Shopmen's Express

Heaters Under Seats and Side Curtains with Flexible Windows Make Fourteen-Bench Car a Popular Smoker on Bay State Street Railway

The withdrawal of a number of closed cars on the Bay State Street Railway for remodeling recently led to an investigation by the management of the possibilities of equipping some of their open cars for peak-load shop service in winter. A fourteen-bench car thus equipped was placed in service on Jan. 24 on the Neponset-Quincy Point line. The car is at present run as an express smoker for men only without stop between Neponset and the Fore River Shipbuilding Corporation's plant, a distance of about 4 miles, the running time being twenty-two minutes compared with twenty-eight minutes by ordinary cars making stops. A single 5-cent fare is charged, and on three recent trips the car carried a total of 284 passengers, the seating capacity being seventy compared with a seating capacity of thirty-four in the usual closed cars operated on this line.

The most interesting features of the car are the use of electric heaters beneath twelve of the fourteen seats, and the provision of transparent, non-inflammable windows 15 in. x 21 in. in size in Pantasote curtains. The car is equipped with forty Gold electric heaters of the cylindrical type wired in two circuits. All seats are equipped except the two end seats, and the corresponding two seats just inside the bulkhead are provided with only two heaters each. The heaters have sheet-iron guards on each side to prevent contact with passengers' shoes. Transite guards 3/16 in. thick are also provided under the seats to serve as heat insulators.



SUMMER CAR EQUIPPED FOR WINTER SERVICE, BAY STATE STREET RAILWAY

HEATING TESTS

Before the cars were placed in service a number of tests of the heating equipments were made. With an outside temperature of 22 deg. Fahr. and the car standing still with curtains lowered, after a preliminary heating of one hour on half-heat, the temperature at No. 1 end inside rose from 22 deg. to 34 deg.; in the middle from 24 deg. to 36 deg.; and at the No. 2 end, from 24 deg. to 38 deg. All the heaters were later switched into circuit, and in a forty-five-minute heat run the temperature of No. 1 end, which had reached 44 deg., rose to 78 deg.; the temperature in the center rose from 50 deg. to 78 deg., and the rise at No. 2 end was from 52 to 76.5 deg. During the forty-five-minute run above summarized, the outside air temperature was 29 deg. Readings were at the height of the passengers' heads.

In a test run from the Washington Avenue carhouse, Chelsea, to Woodlawn and return, about 2 miles, with all heaters on, the interior temperature fell from 77 deg. to 52 deg. between the carhouse and Woodlawn, and from 52 deg. to 49 deg. on the return run, the outside temperature being 29 deg. These figures indicated the feasibility of operating such a car with entire comfort. The current consumption with all heaters in service is 63 amp. at 550 volts, but it is not likely that it will be necessary to run at full heat a large percentage of the time, and it is also to be borne in mind that the service is rendered only in the morning and evening rush hours. This brings the heating demand on the system peak, but the increased carrying capacity of the car partly offsets this. The usual inclosed cars of the company at the terminals of the Quincy Point line were literally deserted by the passengers in favor of the converted unit, and it has been decided to place similar cars in service in Brockton, Lynn, Salem, Lowell, Lawrence, Taunton, Haverhill and Fall River.

The following table gives the cost of adapting the car for winter service:

Temporary vestibules	$30.00
Changing register cords	1.60
Forty Gold heaters	100.00
Two heater switches	14.00
Window material	15.00
Installation of heaters	29.00
Installation of window material	10.00
Transite guards	12.00
Pantasote end curtains	35.50
Total	$247.10

This work can be done in four days, and the car can be dismantled for summer service in half a day. As shown in the illustration, glass windows are used in the converted vestibule, and over the middle window is a 5-in. wooden visor for weather protection. This window is provided with spring hinges, and when the window is opened it is held over the motorman's head in a plane parallel with the visor in front of the window. Extra side curtains of Pantasote are provided to inclose the side of the platform.

The fare register cords have been placed on the interior of the car. It is possible to collect the fares by opening the side curtains at only three or four points in the car, but in the actual handling of traffic the passengers seem to prefer to have the conductor climb over the seats inside of the car rather than to open the curtains.

The flexible windows in the curtains provide ample light for reading. They are made of a material known as "Celestron," furnished by the Chemical Products Company of Boston, Mass. The cost of this product is 30 cents per square foot, compared with 25 cents for celluloid, but celluloid windows are regarded as unsafe, and their use is prohibited by the insurance companies and the Massachusetts Public Service Commission.

New Rules for Cleaning Buffalo Cars

The International Railway, Buffalo, N. Y., has created the position of assistant general carhouse foreman to supervise the cleaning of its cars. Heretofore this work was handled by the carhouse foreman of the separate barns. The new cleaning and sanitary rules are:

"In the interior of the car, all woodwork, moldings, headlinings, window posts, seat cushions and backs, must be thoroughly wiped down with cheesecloth dusting rags; lamps must be thoroughly cleaned with damp chamois skin; all soiled signs must be replaced with clean ones; ironwork in cabs and seat pedestals must be thoroughly wiped down, first with damp kerosene waste, then with dry waste; all pockets must be thoroughly cleaned with wide-blade scrapers to be furnished for the purpose; all mopboards and floors must be cleaned

with soap and water or car cleaner; the solution must contain the proper amount of disinfectant; windows must be cleaned with pumice stone or cleaning powder; after the glass is clean it must be polished with damp chamois skin. All surfaces on the exterior must be cleaned with a special cleaner, and in dry weather the exterior must be wiped down with waste."

Relay for Controlling D.C. Circuit Breakers

The relay shown in the accompanying illustration has been developed by the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa., to give overload protection on d.c. circuits. The operating parts of the relay include a small two-pole electromagnet with a special winding and a simple adjusting mechanism. These are inclosed in a dustproof aluminum case.

The electromagnets are so wound that the relay will operate on from 50 to 80 millivolts. It can, therefore,



OVERLOAD RELAY FOR D.C. CIRCUITS

be used with the standard 50-millivolt ammeter shunt without appreciably affecting the meter reading.

The relay is particularly applicable where it is necessary to open a circuit breaker by current other than that in the line in which the breaker is placed. For example, with three-wire generators, the circuit breaker is in the main line, but the tripping coil must be controlled by the actual armature current of the generator. By the use of the relay the circuit breaker can be located at the most convenient place in the line which it is to open, and be controlled by the current in another circuit by simply inserting an ammeter shunt in this circuit and running light leads to the relay.

Meter for Measuring the Heating Effect of Varying Currents

The continuous capacity of a railway motor which is limited by the amount of heat which it can dissipate is determined by the maximum value of the root-mean-square current at which it can operate without exceeding a safe rise in temperature. This root-mean-square current is the square root of the average of the squares of the instantaneous current values over a given period of time. The determination of the current value by the ammeter method where the current is changing rapidly is not only difficult but tiresome and expensive, especially when readings must be taken over a considerable period of time on a moving car or a locomotive.

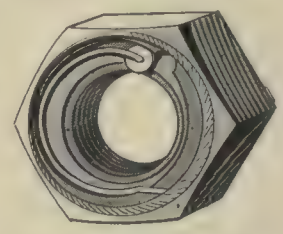
To avoid these difficulties the Westinghouse Electric & Manufacturing Company has developed the root-mean-square meter in which all or part of the current is measured by passing it through a resistor immersed in a quantity of water. Since the heat generated is proportional to the square of the current the temperature of the water will, except for heat losses, be raised in the same proportion. Every change in current value will virtually be recorded on the basis of the square of the current at infinitely small time intervals by the rising temperature of the water. Rapid radiation of heat is prevented by the use of a vacuum jar, and in external appearance the meter looks very much like the ordinary thermos bottle. To determine the root mean square of the current it is necessary only to observe the elapsed time and the rise in water temperature. By applying these values to the calibration curve of the instrument the correct result can be readily determined.

By the use of proper shunts for direct-current and instrument transformers for alternating current, this meter can be used for measuring current on high-voltage as well as low-voltage circuits. Careful laboratory tests have shown that the error of this instrument is less than 2 per cent.

A Self-Tightening Combination Plain and Lock Nut

The accompanying drawing shows the "Roller" lock nut with the steel cover removed, this fitting in the recess in the nut face. The lock is a steel roller held in place by a brass spring arm which is anchored at the outer part of the nut. The nut is spun on by hand, whereupon the small steel roller wedges into the threadway and effects an absolute lock against any backward movement of the nut. This lock, however, permits the nut to go forward so that the effect of vibration is to cause the nut to creep up or along the bolt to a tighter seat. The lock nut is therefore not affected by the stretching of bolts since it takes up slack automatically.

To remove this lock nut the application of strong wrench pressure is all that is required. In effecting this removal the roller bites deeper into the threadway, enabling the nut to turn slightly so that the roller then drops into the circular recess, thus allowing the nut to be spun off by hand. It will be observed that only the threadway is nicked, and the bolt thread itself is not injured in any way.



SELF-TIGHTENING PLAIN AND LOCK NUT

This style of lock nut is not dependent on thread friction and is longer lived than a gripping or friction lock nut. It is a combination plain and lock nut in one unit, which combines the functions of a lock nut, a plain nut, a cotter pin and a spring washer, and it is no larger than an ordinary nut. It was placed on the market at the time of the 1916 convention of the American Electric Railway Association by the Roller Lock Nut Company, Inc., New York City, and since that time it has been used successfully by many railways.

Mechanical Training Course for Boys

A systematic course of training open to boys from sixteen to eighteen years of age is in effect at the shops of the United Railways Company of St. Louis, Mo. Each apprentice furnishes his own tools, but the company provides tool boxes. The length of the course is four years. At the beginning the pay is 12 cents an hour, and this is increased at the rate of 1½ cents per hour every six months. Every apprentice must attend school at least two nights a week in conjunction with his instruction in the shops. This gives the necessary training in mathematics, drafting and applied science, the course being arranged by the master mechanic in conference with the school authorities. The tuition is paid by the railway company.

News of Electric Railways

Financial and Corporate | Traffic and Transportation | Personal Mention | Construction News

Five Electrification Projects

Lehigh Valley, Boston & Maine, Pennsylvania, Erie and Chicago Terminal All Included in Current Reports

The past week has been notable for the number of rumors that have been reported of electrification on various steam railroads. Of these the project of the Lehigh Valley Railroad is the most ambitious as well as the most definite. The company authorizes the statement that W. J. Wilgus has been retained as consulting engineer to investigate the possibility of electrifying a section of the main line from Mauch Chunk, Pa., to Pittston Junction, a distance of 63 route miles. This section is double-tracked throughout and includes a 25-mile low-grade freight cut-off past Wilkes-Barre. The company's main coal-carrying branch also is involved in the electrification project. This is a 52-mile double-track line. It extends eastward from Mount Carmel, Pa., through the anthracite mining district and joins the main line at Penn Haven Junction, just north of Mauch Chunk.

$20,000,000 Involved

From this outline of the projected electrification it is evident that the Lehigh Valley has under consideration the electric operation of the heavier part of its tonnage trains of coal, since the electrified divisions are located within the mountainous districts containing the anthracite coal fields and serving the railroad's west-bound traffic across the mountain range traversed by the main line. The total route of 115 double-track miles, including the Wilkes-Barre cut-off and sidings, if electrified, is likely to involve an expenditure approaching $20,000,000, but in view of the heavy coal traffic that the road has handled during the past year or two, a large return on the investment should be possible. Power at a low price should be available from the several large central stations that have been constructed in the coal regions to make efficient use of refuse from the numerous anthracite mines. Data regarding the character of electric equipment to be installed are, of course, lacking at the present time, but indications are that the engineer's report on the project will be completed within a few months. A definite decision in regard to the commercial possibilities of the proposed installation will then be possible.

Less definite than the report regarding the Lehigh Valley's electrification is the rumor that Chicago's steam railroad terminals are to be electrified as a sequel to the recently announced plan of electric operation of the Illinois Central Railroad's terminal service. This has its basis, apparently, in the fact that a bill requiring electrification for all Chicago roads within ten years is to be introduced at the Illinois State Legislature now in session in Springfield, Ill.

A legislative act to provide for electrification of a 10-mile branch of the Boston & Maine Railroad between Dover and Portsmouth has also been introduced in New Hampshire. The aim here is to establish an hourly passenger service between the two cities mentioned.

Baltimore Work Probably Not Immediate

A rumor to the effect that the Baltimore tunnel electrification plan of the Pennsylvania Railroad has been revived has also been going the rounds during the week. This, however, appears to have originated largely in the fact that the railroad company is endeavoring to secure permission to expand its facilities in Baltimore, since three ordinances regarding improvements to the company's line in that city have been introduced. None of these, however, includes any statement regarding electrification, and there is no warrant for expecting any immediate installation in Baltimore in connection with this matter, although the possibility of electrifying the main line of the Pennsylvania Railroad between Baltimore and Washington has been under consideration for several years past.

Very much the same considerations apply to a revival of the rumor that the Erie Railroad is to install electric operation on the Jersey City-North Newark section of its Greenwood Lake Branch. This has been talked of for years, and owing to the preponderance of local passenger traffic on the line, and the necessity for frequent short trains, the opportunity for economy through electrification is more or less obvious. It is doubtful, however, whether traffic is sufficiently heavy to warrant the increased investment, and at the present time the project is just about where it has been for the past five years.

Bridge Controversy in Kansas City

Bond Filed by the Kansas City Railways Secures Right to Operate Over the Kaw River

The federal court has been asked to intervene to protect street railway traffic between the Kaw River district of Armourdale, Argentine and connecting lines, and Kansas City, Mo., over the river. The specific proceeding was a temporary injunction granted at the request of the Kansas City Railways, preventing the destruction of the Kansas Avenue Bridge. The Kaw Valley Drainage Board had ordered this bridge destroyed as a flood menace. The railway was using this bridge. The company had previously been denied the use of the Twenty-third Street trafficway bridge and viaduct, which was to replace the Kansas Avenue bridge. The result would have been the stopping of railway traffic at this point, and the isolation of a large district.

How the Situation Arose

The situation arose because the commissioners of Wyandotte County demanded a large payment by the railway on the new viaduct, whereas the company's share of expense on the viaduct was otherwise provided for in a contract that was made last summer by the company with the commissioners.

The Kansas Avenue bridge over the Kaw River has been used for years for wagon, foot and street railway traffic. The Twenty-third Street viaduct and bridge were to replace it. The building of the temporary approach on the Missouri side, and the completion of track-laying on the entire bridge and viaduct, and approaches, made possible the use of this substitute bridge almost at once. Just as the company was preparing to use the new structure, however, and when the Kaw Valley Drainage Board had issued its order for the destruction of the Kansas Avenue bridge, the county commissioners demanded that the company pay to the county $250,000 before the commissioners would allow the company to use the trafficway. The $250,000 represented one-half the cost of the trafficway. With one bridge ordered destroyed and the use of the other interdicted except on terms involving disregard of a suit that was pending the company as a last effort in its own interest appealed to the federal court.

On Feb. 1 an agreement was reached in the federal court whereby the company will put up a bond and the Wyandotte County Commissioners will allow the company to use the Twenty-third Street trafficway as soon as the Kaw Valley Drainage Board begins the destruction of the Kansas Avenue bridge. The controversy over the payment of the railway's share on the trafficway is left for settlement to the suit now pending. A bond of the company will guarantee that it will pay in accordance with the ruling of the court in that suit.

Col. Williams Hits Commission

Asks if Regulation Is Worth the Price—Commissioner Whitney Replies

The current number of the monthly publication of the Brooklyn (N. Y.) Rapid Transit Company contains two contributions from the pen of Col. Timothy S. Williams, president of the company. The first severely criticizes certain "short-sighted men in office who play the rôle of demagogue," and later on says that "indulgence in official graft" has given way to "political hypocrisy." The second article, "The Price of Regulation," deals directly with the Public Service Commission. The first article said in part:

"There will be at least one fixed rule of conduct scrupulously adhered to so long as the writer [President Williams] has any influence in the management of the B. R. T. system. That rule is frankness, observance of obligations and honesty. If, as occasionally happens, short-sighted men in office play the role of demagogue, and seek to make personal capital unjustly at the expense of our corporation, we shall expect to tell the truth, even though that truth may offend the sensibilities of those whom it hits. Indulgence in official graft has fortunately become obsolescent, but political hypocrisy is conceded to be more prevalent than ever. One way of meeting this new tendency is by cajolery (commonly known as 'jollying'), flattery and meekness, so that the Pharisee in office may gratify his taste for publicity while at the same time privately bargaining with the corporation. This is not the right way nor the safe way."

The second article, after discussing the third-tracking of the company's elevated lines, says in part:

"It will be remembered that when the dual system contracts were under consideration the city's representatives insisted upon a provision that even when the companies were expending their own money the Public Service Commission should have complete authority over plans, specifications, form of contract, award of contracts, and costs. The Interborough Company refused to accept all of these drastic provisions as to its own third-tracking work. The Brooklyn company deferred to the city and accepted them.

BROOKLYN COMPANY MORE CONFIDING

"The Interborough Company was more worldly wise. We were less sophisticated and more confiding. We trusted to the good faith, reasonable judgment and prompt action of the Public Service Commission. The Interborough went promptly to work, made its own plans and specifications, let its own contracts (without competitive bidding), determined its own costs, and the result is a completed third-track in operation a whole year.

"The Brooklyn company went to work with equal zeal, but at nearly every step has encountered delay, criticism, supervision, or opposition as the penalty for subjecting its efforts and expenditures to what is called official regulation and supervision. Is regulation worth the price? And why was there discrimination?"

MR. WHITNEY'S ANSWER

To these criticisms Travis H. Whitney of the Public Service Commission replied in part:

"The statements made by Colonel Williams are mostly untrue. As a matter of fact, the B. R. T., with the alleged burden of approval by the commission, has succeeded in completing more mileage of rapid transit lines and in getting them into operation earlier than has the Interborough. The work upon which he congratulates the Interborough is the third-tracking of the Second, Third and Ninth Avenue lines, completed and put into operation on Jan. 17, 1916, to the extent of a little over 12 miles of track. At that time the B. R. T. had at least three times this mileage of rapid transit lines in operation. Apparently by this article Colonel Williams is seeking to convince his directors and stockholders that the Public Service Commission has delayed the completion of the Fulton Street third-tracking. As to this I merely wish to state that shortly after the dual contracts were signed Colonel Williams himself applied to the commission in the matter of the relocation of the elevated in Adams Street, thus making the lower end of Fulton Street an open question."

City Rejects Payment

Seattle Rejects Payment Tendered with Conditions Attached

The Puget Sound Traction Light & Power Company, Seattle, Wash., as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 3, page 221, tendered the sum of $64,387, representing 2 per cent of its gross earnings for 1916, to the city recently under protest, with the stipulation that in accepting it the Council agreed not to begin a suit to require compliance with franchise obligations that require paving of right-of-way with the same material and at the same time that the remainder of the street is paved. Walter F. Meier, assistant corporation counsel of the city, advised the Council to return the check to the company unless the company was willing to pay the sum named under protest and without further conditions. On Jan. 24 the Council, in reply to the tender, adopted the report of its finance and franchise committees and rejected the tender. In his opinion to the Council Mr. Meier said:

"Whether the city shall insist upon the enforcement of the obligations inserted in the franchises granted by it is wholly a question of policy, determinable by the legislative department of the city. The acceptance of such tender, with the conditions annexed, would constitute a voluntary surrender by the city of its present right to insist upon complete compliance with the terms and conditions inserted in the franchises now held by the Puget Sound Traction, Light & Power Company. We are unwilling to say that the acceptance of a tender conditioned as this one is would not lead to undesirable legal complications, and unless the city desires to reverse its policy, then the check of the company should be returned with the statement that if the company desires to pay the amount due under protest but without attaching any conditions thereto, other than its payment under protest, the same will be accepted. The city does not recognize the right of the company to attach any conditions whatever to the payment of 2 per cent of its gross earnings as required by its franchises, and unless the company complies with this condition, the city will institute proceedings to compel compliance in this respect."

WHAT THE COMPANY ASKED

Nearly two years ago the company petitioned the Public Service Commission for an order relieving it from certain of its franchise obligations, the payment of 2 per cent of its gross earnings to the city annually, the paving of its right-of-way and the payment of any portion of the cost of Lake Washington Canal or other waterway bridges. Since then the tax on gross earnings has been paid under protest, and the right-of-way has been planked rather than paved. In tendering the amount due for 1916 the company took into consideration the action of the Council in directing that suit be instituted to force it to pave its right-of-way rather than to plank it, and made it a condition of acceptance of the gross earnings tax that no such suit would be started until the Public Service Commission had acted on its petition for relief.

Labor Opposes Constabulary

Representatives of organized labor appeared in force at Albany on Feb. 13 at a joint hearing before the finance committee of the New York Senate and the committee on ways and means of the Assembly to oppose the bill introduced by Senator Mills to create a State constabulary. A similar bill was defeated in the Legislature last year, largely on account of labor opposition. The labor men were the only ones to oppose the present bill. They heckled George F. Lum, deputy superintendent of the Pennsylvania State Police, and attacked the work of the Pennsylvania constabulary in the recent strike of the employees of the Wilkes-Barre (Pa.) Railway. Representatives of labor insisted the bill should be amended so as to eliminate the proposed constabulary as an agency for the maintenance of order in labor disturbances. They want the activities of the force confined to patrol duty and the suppression of crimes and disorder in the rural districts. President Holland of the State Federation of Labor said that industries which desired special protection should pay for it and not seek to shift the expense to the taxpayers.

Operating Allowances Discussed

The request of the Cleveland (Ohio) Railway for an increase in its operating allowance under the Tayler franchise has brought forth a flood of suggestions and criticisms from the friends of 3-cent fare. Councilman Stolte has proposed competing lines, although the city has guaranteed the dividends on railway stock. Councilman Harry C. Gahn believes that if the Council refuses the increase requested the matter should be submitted to a referendum vote. Fielder Sanders, street railway commissioner, is protesting against paying off the operating and maintenance deficits in lump sums at once. He argues that the company should charge these amounts off in monthly payments.

Commissioner Sanders has submitted his ideas of a subway terminal to the City Plan Commission, but has not yet made his report to the City Council on his investigation of the matter in eastern cities.

Councilman Taylor has proposed that the street railway commissioner's office be done away with and that the money spent by that office be applied as relief to the allowances for operation and maintenance, which are now insufficient.

Wheeling Wages Readjusted

Supplement to Existing Contract on Wages Agreed to by Company and Men

On May 1, 1915, the Wheeling (W. Va.) Traction Company entered on the fourth three-year agreement with its trainmen, as local union No. 103 of the Amalgamated Association of Street & Electric Railway Employees of America. This agreement provided for a sliding scale of wages ranging from 22 cents an hour for the first year of service up to a maximum of 31 cents an hour during the last year of the contract, the men being increased 2 cents an hour upon their respective anniversaries with the company. On Jan. 1, 1917, the scale ranged from 22 cents to 30 cents, and the contract still had sixteen months to run.

During the early part of January the union, citing the increased cost of living as its reason, passed a resolution requesting the company to change Sec. 1 of the existing contract. This section covered the wage scale, and made it necessary for a man to be in the service at least five years to reach the maximum wage. The change which was asked was to the following scale: first six months, 30 cents; second six months, 32 cents; third six months, 34 cents; after eighteen months, 36 cents.

In its consideration of the matter the company was governed by many factors. Due to the unusual industrial conditions and the high price paid for labor particularly by the steel mills of the Wheeling district the company was unable to obtain the class of men it desired for its service. In addition it felt that the men were entitled to at least a temporary increase due to the unusually high cost of living. For these reasons the company was willing to deal with the men for a revision of Sec. 1 of the existing contract, but did not see fit to grant the increase asked for by the union. After several conferences between the officials of the company and the union, a supplement to the existing agreement was signed on Feb. 5, providing for the payment of 3 cents an hour from Jan. 1 to April 30, 1917, in addition to the rate called for by the existing contract; from May 1, 1917, to the expiration of the present agreement, or April 30, 1918, 4 cents an hour in addition to the rates called for by the contract for the first and second year in the service of the company and 3 cents an hour in addition to the contract rate to those men more than two years in the company's service. This means that until April 30, the scale will be from 25 cents to 33 cents and from May 1, to the expiration of the agreement, from 26 cents to 34 cents an hour, or an increase over the contract rate of approximately 10.8 per cent for the first mentioned period and 11.2 per cent for the last-mentioned period.

In addition the company voluntarily suggested and incorporated in the supplemental agreement a provision that its men receive an additional 3½ cents an hour while breaking in students. No additional pay had been allowed for this work in the past and the company believes that with this inducement its students will be better trained.

Mr. Dempsey Sentenced

Fine of $500 Imposed in What Is Said to Be First Conviction for Failure to Obey Commission Order

John J. Dempsey, superintendent of elevated transportation of the Brooklyn (N. Y.) Rapid Transit Company, was fined $500 on Feb. 13 by County Judge Roy for failing to obey an order of the Public Service Commission. The fine was paid under protest. Mr. Dempsey was convicted of failing to stop the Fifth Avenue "L" trains at Third Street, as ordered by the commission. Judge Roy said:

"The verdict in your case, Mr. Dempsey, is more a conviction of the railroad system of this borough than a conviction of you personally. The evidence presented by the District Attorney fully justified the conviction. The order of the commission which you were charged with failing to obey was plain and simple and could not have been misunderstood. Yet for over three years it was repeatedly disobeyed. The vast majority of our citizens have a deep-seated conviction that the railroad has persistently sought to discredit the commission and its orders. I am told this is the first conviction in this country for violation of a Public Service order. Probably for this reason, but also because you are not an officer of the corporation, I consider the ends of justice will be met by the imposition of a fine of $500."

In the plea which he made for Mr. Dempsey before sentence was passed Attorney Marsh for the company reviewed the entire proceeding. He concluded his remarks with this appeal to the court:

"Unless the court believes the violation was willful and intentional, it would seem to be unthinkable that a sentence of imprisonment or anything but a nominal fine should be imposed."

First Arbitration in Kansas City

Outside Expert Passes Upon Questions in Dispute Under the New Franchise

Under the franchise of the Kansas City (Mo.) Railways the city's interests are handled by Robert P. Woods, and the company's by Philip J. Kealy, who together constitute the board of control. The franchise provides that when these members are unable to agree the Court of Appeals shall act as or appoint an arbiter. The first case of difference developed about a month ago. The court appointed James E. Allison, at one time chief engineer and commissioner of the St. Louis Public Service Commission, to render a decision. The city contended that $30,000 paid by the company in lieu of transporting dirt from the station park, which moving of dirt had been required in the franchise, should be charged to operating expense. Mr. Allison held that it should go into the company's valuation. The city contended that $41,000 paid to the city and to the city's attorneys and appraisers who aided in the negotiations for a new franchise should be charged to the reorganization fund, and not be charged to either capital or operating expense. Mr. Allison upheld the city's contention. The city contended that all expense of constructing new tracks, tearing out the old tracks, and making replacements should be charged to operating expense. Mr. Allison decided that such expenses are a capital charge and should be added to the investment.

Power Improvements in Detroit

Early in the spring the Detroit (Mich.) United Railway will begin work on extensive improvements at power station B, Atwater and Riopelle Streets. Included in the improvements will be a new smokestack, 250 ft. high, 14½ ft. in diameter inside, at the top.

There are at present three sets of boilers, eight 250 hp., eight 300 hp. and eight 350 hp. The battery of eight 250-hp. boilers will be removed and for the present in place of these boilers will be installed four type M-22 Stirling boilers of 603 hp. each with superheaters. Space will be left for the installation at a later date of two additional boilers.

This work will involve substantial building alterations. Excavations will be made for a basement, the floor of which will be below the grade of the present boiler room floor.

The new boiler room floor will be several feet above the level of the present boiler room floor. The section of the roof over the eight boilers that are to be removed will be raised about 18 ft. The present bucket coal conveyor, which now serves the eight 250-hp. and the eight 300-hp. boilers, will be maintained in operation throughout the alterations. The present steel and concrete coal bunkers will be enlarged by extending the sides vertically. Larger steel supporting columns for these bunkers will replace the present columns. A new ashbin with an independent ash-conveying system will be built. Two Griffin steam ash conveyor systems will be installed, one from the present 300-hp. boilers, and one from the new 600-hp. boilers. Six retort Taylor stokers will be installed under the boilers, and Diamond soot blowers will be used. Turbine driven pumps will be used for boiler feed. The distance of the mud drums of the Stirling boilers above the floor line will be 8 ft., which with the ample capacity of the stack will insure smokeless operation.

Increase in Wages in Ohio.—The Ohio Electric Railway, Springfield, Ohio, operating 617 miles of city and interurban lines, has announced an increase in the wages of its trainmen amounting to from 2 to 3 cents an hour.

Increase in Wages in Portland.—The Portland Railway, Light & Power Company, Portland, Ore., has granted an increase in pay to its trainmen and has agreed to allow for "deadhead" time. Details will be announced shortly.

Surface Contact System Reappears.—In the basement of a large building in Allentown, Pa., a working model of the surface contact system has been rigged up for public demonstration. It is reported that a stretch of road equipped with the system will be built in Allentown for demonstration purposes.

Progressives to Consider Municipal Ownership.—At a conference of Progressive leaders at Atlanta, Ga., on Feb. 14 plans were laid for the national conference of Progressives at St. Louis on April 12. Resolutions were adopted approving the speech of John M. Parker, New Orleans, the candidate for vice-president on the Progressive ticket at the recent national election, recommending that the St. Louis convention consider public ownership of public utilities.

Bill to Cut Commission Powers.—As an aftermath to the request of the Tacoma Railway & Power Company to the Washington State Public Service Commission to be relieved of certain obligations imposed by the ordinance under which it is operating, a bill has been introduced in the Legislature by Senator Johnson, Spokane, amending the Public Service Commission act so as to put it beyond the power of the commission to grant any such relief from the provision of any franchise, ordinance or law under which a public service corporation is operating.

Mr. Thompson to Report That Regulation Has Failed.—In a speech which he made on Feb. 10 Senator George F. Thompson, chairman of the Legislative committee which inquired into the workings of the Public Service Commissions in New York, said: "The committee is going to report to the Legislature that regulation of public utilities has failed, because the Public Service Commission has not the power to regulate them, and because the commission is compelled to perform inconsistent duties. Responsibility is not centralized in anybody."

Hamilton Strike Settled.—The strike of the employees of the Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, has been settled and the men have returned to work. The representatives of the men and Benton S. Oppenheimer, the receiver of the company, are to confer with the end in view of settling such differences as exist, with arbitration as the final recourse for the adjustment of any matters they are unable to dispose of by agreement between them. The final settlement, however, is to be subject to approval by the court having jurisdiction over the property.

Denver Company Advertises Among Its Own Men for Help.—I. M. Ristine, supervisor of employment of the Denver (Col.) Tramway, advertised as follows over his own name in *The Tramway Bulletin* for January, 1917: "Wanted—An Engineer: Mr. Kendall wants a man with engineering education or experience to work out the most economical schedule speed for each city car line, with the corresponding power consumption and per cent coasting. It is the policy of the Denver Tramway to make appointments from among present employees whenever the right man for the job can be found without going outside of the organization. Applicants please apply at Room 202." Mr. Kendall is efficiency and traffic engineer of the company.

Conference on San Francisco Tracks.—As a means of obviating the necessity for the construction of additional tracks on upper Market Street by the Municipal Railway, two compromise proposals were presented at a special meeting held in San Francisco, Cal., on Feb. 3 by the public utilities committee of the Board of Supervisors. One of these proposals was offered by Jesse W. Lilienthal, president of the United Railroads, and the other by M. M. O'Shaughnessy, city engineer of San Francisco. Both measures will afford direct transportation through the Twin Peaks Tunnel down Market Street over the tracks now in use. The committee took the matter under advisement and voted to lay the matter over for another week. No action was taken on the resolution proposed earlier in the week for the purchase of the United Railroads by the city.

Programs of Association Meetings

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association will be held at the Claypool Hotel, Indianapolis, Ind., on March 8 and 9. The executive committee meeting will be on the evening of March 7. On the evening of March 8 the annual dinner and dance will be held. This promises to be a particularly interesting feature as the committee in charge has arranged for a number of new features.

New England Street Railway Club

The February meeting of the New England Street Railway Club will be "Maine Night." It will be held at the Copley Square Hotel, Boston, Mass., on Feb. 22. All arrangements for the meeting have been made by A. H. Ford, vice-president of the club and vice-president and general manager of the Cumberland County Power & Light Company, Portland, Me. Mr. Ford has been able to secure as speaker William T. Cobb, of Rockland, Me., former Governor of that State, of whom a brief biography is published elsewhere in this issue. His subject will be "Public Relations."

New York Electric Railway Association

The program for the twenty-second quarterly meeting of the New York Electric Railway Association, to be held at the Hotel Astor, New York, N. Y., on March 2, has been announced. The program of papers follows:

"Indemnity and Surety Bonds," by William N. Tomlins, Jr., vice-president and manager of the Metropolitan Department of the American Surety Company, New York.

"Redeemable Cash Fare Receipts," by R. W. Palmer, general manager of the Auburn & Syracuse Electric Railroad, Auburn, N. Y.

"Recent Tendencies in Taxation Matters," by R. L. Rand, vice-president of the Richmond Light & Railroad Company, New Brighton, N. Y.

Methods of discipline in the following departments will be discussed: (a) Ways and Structures, (b) Mechanical, (c) Power, (d) Transportation, (e) Office.

Instead of having a written question box, it is proposed to have delegates representing member companies present their troubles in person at the meeting with a view to exchanging ideas and receiving the benefits of the ideas of others, including representatives of the manufacturers.

The meeting will conclude with a formal dinner at the Hotel Astor at 7.30 o'clock, after which several prominent speakers will address the association. All requests for hotel accommodations should be made to the Hotel Astor. At this meeting a new policy, on the part of the association, will be inaugurated in that a charge of $5 will be made for each dinner ticket partially to defray the expense of the dinner and the meeting. Tables will be arranged to accommodate parties of eight. Places will be assigned in the order in which applications are received. A buffet luncheon will be served during the progress of the meeting.

Financial and Corporate

Annual Reports

Chicago City & Connecting Railways Collateral Trust

The annual report of the Chicago City & Connecting Railways Collateral Trust, Chicago, Ill., for the calendar year 1916 shows a net income increase of $279,223 or about 50 per cent over 1915. This gain was secured through a rise of $285,505 or 15 per cent in gross income and an increase of only $6,282 or 0.5 per cent in total disbursements. The surplus, however, because of a larger dividend on the participation shares, was less than half that at the end of the preceding year. Dividends at the rate of $3.25 per share were paid on the 250,000 preferred participation shares outstanding as compared with $2 in 1915.

The increase in disbursements was brought about by increased taxes in spite of lower interest charges and less general expense. The taxes increased $17,279, or about 200 per cent, on account of the federal tax on net income. This item increased this year, and in addition, the new law raised the rate from 1 to 2 per cent. In 1913 and 1914 the trust paid no taxes at all, because the counsel for it believed that it was not subject to taxes, and this was substantiated by the Government in a minor decision. Later the Government reversed its decision, and the trust has been paying the taxes since, although suit is now pending for their recovery.

The income statement for the last two years follows:

	1916	1915
Dividends	$1,979,750	$1,704,352
Interest	91,256	88,855
Other income	29,662	21,956
Gross income	$2,100,668	$1,815,163
Interest on bonds	$1,087,208	$1,094,750
Bond redemption	105,000	105,000
Interest on bills payable	24,908	24,784
General expense	20,978	24,557
Taxes	26,052	8,773
Total disbursements	$1,264,146	$1,257,864
Net income	$836,522	$557,299
Dividends on participation shares	812,500	500,000
Surplus income	$24,022	$57,299

York Railways

Although there was an extraordinary increase of $59,134 or 12.4 per cent in the operating costs of the York (Pa.) Railways during the fiscal year ended Nov. 30, 1916, as compared to the preceding one, this was more than met by the gain of $139,196 or 16.8 per cent in gross earnings. The 1916 totals were $967,496 and $537,248 respectively.

The so-called "operating expenses" totaled $445,946, an increase of 8.4 per cent, while the allowances for depreciation amounted to $40,541, a rise of 96 per cent, and taxes to $50,760, an increase of 10 per cent. In spite of these, however, the net earnings at $430,248 showed an increase of $80,062 or 22.8 per cent. The gain was reduced somewhat by an increase of $19,601 or 8.1 per cent in interest and bond discount, but the net income totaled $171,172, a gain of $60,460 or 54 per cent. After the payment of $100,000 in dividends and certain small adjustments the surplus on Nov. 30, 1916, amounted to $208,323. As noted in the ELECTRIC RAILWAY JOURNAL of Jan. 6, the company has declared 2½ per cent of deferred dividends on its preferred stock.

The expenditures charged to cost of property during the year for the railway department were $2,936 for additional track and $31,919 for new cars and equipment. The total capital expenditures, covering the lighting and heating divisions as well, were $136,499.

The York Railways was incorporated under the laws of Pennsylvania in 1907 and controls all the local lines in York and also owns practically the entire stock of the Edison Light & Power Company, York. The total track operated is 84.46 miles, of which 25.79 miles are in York.

Merger Planned in Spokane

Washington Water Power and Inland Empire Lines in Tacoma Involved

After nearly fourteen years of competition the Washington Water Power Company and the Inland Empire Railroad are trying to arrange for the consolidation of their local lines in Spokane for their mutual benefit. The city of Spokane looks favorably upon the plan, particularly as it seems likely to result in corporation ownership with municipal control.

The move toward consolidation comes as the result of a recent opinion handed down by the Public Service Commission forbidding the abandonment of owl cars as a measure of economy and requiring the companies to obtain the consent of the commission to the use of one-man cars. As noted in the ELECTRIC RAILWAY JOURNAL of Jan. 27, page 184, the commission actually suggested the merger plan as a substitute. Attorneys for the companies acted at once upon the suggestion and a bill providing for the consolidation or lease of the properties is before the Legislature.

At many places in Spokane the tracks of the two systems are needlessly close to one another and four of the main lines of the Washington Water Power Company parallel those of the Inland Empire System for more than twenty blocks at a distance apart of never more than three streets. In one instance the two companies use the same track for a distance of nearly half a mile.

The Washington Water Power Company was first to adopt the pay-as-you-enter cars, and soon after the advent of the jitney it introduced the one-man car Opposition developed at once to the one-man car, and the commission, in the decision referred to previously, held that the companies should in the future submit to it for approval lists of routes of their respective lines upon which they desired to operate such cars and that the cars should be approved by the commission before they were placed in service.

The pay-as-you-enter car as operated in Spokane has been approved by the public, and the prejudice against the one-man car is fast disappearing. It is not uncommon, however, on account of the multiplicity of service, for cars on such lines as the one running to Fort Wright, to make the entire trip to the city with a single passenger after the evening rush hour. Small branch lines are run across certain sections of the city connecting remote districts with the main lines which go to the downtown section, and these never handle traffic which one-man cars could not easily carry. It is on such lines that the single employee system was first worked out and the plan has been developed until it is used on all lines of the Washington Water Power Company now except during rush hours, when a conductor stands in the front vestibule with the motorman to collect fares.

In referring to the bill placed before the Legislature by the company attorneys, C. S. MacCalla, general manager of the Washington Water Power Company, said:

"No one can say at this time what we will do if this bill is passed, but even if we wanted to we could not carry out the suggestion of the Public Service Commission without a law of this kind. Districts that now have two lines operating on ten-minute schedules could be served just as well by cars on one line running every five minutes. Both of the present systems could be operated from one power plant. It has been figured that an amalgamation would mean a saving of 20 per cent in trackage and 25 per cent in operating expense."

As for the jitney, which has gained a strong foothold in Spokane, that form of transportation would seem likely from the course that events are taking to be confronted soon with a consolidation of the existing street railways, a keener fight than ever for patronage and possible municipal intervention through probable participation by the city in the management of the street railways.

The Spokane & Inland Empire Railroad operates 45 miles of track in Spokane through its ownership of the Spokane Traction Company. The Washington Water Power Company operates in Spokane through its ownership of the Spokane Street Railway, the Spokane Cable Railway, the Spokane Electric Railway, the Ross Park Street Railway and the City Transit Company. In all, the company owns and operates 112 miles of street and interurban railway.

$3,500,000 Deal Completed

Control of Ironwood and Bessemer Properties Passes to L. E. Myers

L. E. Myers of the L. Myers Company, contractors, Chicago, Ill., has purchased the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., including the Gogebic & Iron Counties Railway & Light Company, the Ashland Light, Power & Street Railway, Ashland, Wis., the Ashland Power Company, Hurley (Wis.) Water Company, and Ironwood Water Works Company. The Big Falls, Tylers Fork, Brownstone Falls, Copper Falls and Superior Falls power developments on the Montreal, Flambeau and Tylers Fork Rivers are also included in the transfer. On the completion of the power development work that is now under way these properties will comprise about 40,000 hp. in water power and steam auxiliaries. About 9000 hp. in steam plants is under construction. The consideration involved in the sale was about $3,500,000. L. E. Myers has been elected president of the several companies and L. N. Bosen of the Myers Company has been elected vice-president. The present local managements will be continued.

Chicago Agreement Continued

The three-year operating agreement entered into by the Chicago Railways and the Chicago City Railway in January, 1914, to form the Chicago Surface Lines as the operating company, was renewed at a meeting held on Feb. 7, for another three-year period. The following members of the board of operation were re-elected: Henry A. Blair, Charles C. Adsit, Wallace Heckman and John M. Roach, representing the Chicago Railways, and Leonard A. Busby, H. B. Riley and F. O. Wetmore, representing the Chicago City Railway. Mr. Blair was re-elected chairman of the board and Mr. Busby, president. F. D. Hoffmann was re-elected secretary and assistant treasurer; M. B. Orde, treasurer; Frank L. Hupp, assistant secretary; John J. Duck, general auditor, and W. W. Gurley, general counsel.

Empire United Reorganization

Formal Plan Not Announced—Unofficial Statements Indicate Segregation of Properties

The formal plan of reorganization of the Empire United Railways, Inc., Syracuse, N. Y., has not been announced. Unofficial statements in regard to the proposed plan indicate, however, a readjustment of the finances of two of the constituent companies without sale at receivership, and their consolidation into a new company, and the segregation of the property of the Rochester, Syracuse & Eastern Railroad.

The new company to take over the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Railroad will, it is said, be financed and managed by Ford, Bacon & Davis, New York, N. Y. This company will likely be capitalized on the basis of $500,000 of authorized three-year 6 per cent notes, $1,000,000 of authorized Series A 6 per cent cumulative preferred stock, $1,250,000 of authorized Series B 6 per cent non-cumulative preferred stock and $1,500,000 of authorized common stock. Of these securities there will be issued at this time all of the authorized Series B preferred stock and all of the common stock, but only $350,000 of the three-year notes and $200,000 of the Series A preferred stock. The basis of the distribution of these securities has not been indicated, nor has any statement been made as to how under the plan as so far developed the holders of the preferred and common stocks of the Empire United Railways would participate.

The following statement is credited to James M. Gilbert, chairman of the protective committee of bondholders of the Syracuse, Lake Shore & Northern Railroad.

"A proposition was submitted to us by the committee representing the bondholders of the Empire United Railways, which contemplates the payment in full of the unpaid interest upon the bonds of the Syracuse, Lake Shore & Northern Railroad, together with the foreclosure expenses and the expenses of this committee.

"The plan further provides for the discontinuance of the pending foreclosure proceeding and the discharge of the receivers appointed therein, and the continuance of the bonds of the Syracuse, Lake Shore & Northern Railroad as a first lien on the property covered by the mortgage securing them.

"As this plan puts these bondholders in precisely the position they would have been in if there had been no default in payment of interest, and this at no expense to them, and also provides the road with sufficient cash to take care of its capital requirements, thus greatly improving the value of the security for these bonds, we do not see how, in justice to the bondholders whom we represent, that we could refuse consent."

Brooklyn (N. Y.) Rapid Transit Company.—Eleven of the subsidiary companies of the Brooklyn Rapid Transit Company held annual meetings during the week ended Feb. 3. In the Coney Island & Gravesend Railroad directorate, Howard Abel, comptroller of the Brooklyn Rapid Transit Company, was elected to succeed J. F. Calderwood, who resigned some time ago as vice-president and general manager of the Brooklyn Rapid Transit Company. The directors of the other companies were all re-elected.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—The court has ordered the sale of the property of the Gary, Hobart & Eastern Traction Company, which has been in the hands of Judge O. L. Wildermuth as receiver.

Georgia Railway & Power Company, Atlanta, Ga.—G. W. Brine has been elected a director of the Georgia Railway & Power Company to succeed Asa G. Candler, who resigned from the company before taking the office of Mayor.

Haytian-American Corporation, New York, N. Y.—P. W. Chapman & Company, Breed, Elliott & Harrison, Lawrence Turnure & Company and Hartshorne & Battelle, New York, N. Y., are offering for subscription at 100 and accrued dividend $5,500,000 of 7 per cent cumulative convertible preferred stock of the Haytian-American Corporation, owning and operating railroad, public utilities and sugar properties in the Republic of Hayti. The preferred shares will be accompanied by 25 per cent in common shares and 50 per cent in founders' shares.

Laurel Light & Railway Company, Laurel, Miss.—H. N. Whitney & Sons are offering at 100 and interest the unsold portion of their block of $150,000 of 6 per cent first-mortgage gold bonds of the Laurel Light & Railway Company. The bonds are dated Dec. 12, 1911, and are due July 1, 1936. The bonds are a first mortgage on all of the street railway property acquired since organization and also a lien on the light and power property in Laurel, subject only to $80,000 of bonds of the Laurel Electric Power & Light Company which cover only the original electric light property in Laurel. Eighty thousand dollars of the bonds of the Laurel Light & Railway Company are reserved to retire the bonds of the Laurel Electric Power & Light Company. With the issuance of $12,000 of additional bonds of the Laurel Light & Railway Company, for additional property, the mortgage will be closed. The Fidelity Trust Company, New York, N. Y., is trustee under the mortgage given to secure the bonds.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The annual meeting of the stockholders of the Milwaukee Electric Railway & Light Company will be held at the office of the company in Milwaukee, on Feb. 21, for the purpose of electing three directors to fill the vacancies caused by the expiration of the term of office of the directors of the third class; "to consider and take action upon the proposition of purchasing the properties and franchises of other utilities," and for the transaction of other business.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—An application has been filed with the California Railroad Commission by the Oakland, Antioch & Eastern Railway for authority to issue five one-day 5 per cent notes of a par value of $18,000 each, in forms similar to a note at the present time held by the Union Trust Company, San Francisco, for $90,000, which is dated Oct. 31, 1915, payable in one day and bearing interest at 6 per cent. The five notes are to be secured by bonds now securing the note to the Trust Company, the total of the bonds being $150,000. The $90,000 note is indorsed by John I. Walter, H. C. Breeden, W. Arnstein, S. Naphtalis and Henry T. Scott. It is proposed that these indorsers pay this $90,000 note and take the five notes for that total amount.

Ottawa (Ont.) Traction Company.—At the annual meeting of the Ottawa Traction Company, A. J. Dawes, Montreal, was elected to the board to fill a vacancy, and former officers were re-elected.

Pine Bluff (Ark.) Company.—The controlling interest in the Pine Bluff Company has passed from Ford, Bacon & Davis interests to W. S. Robeneck, Thornton; H. C. Couch, Arkadelphia; Charles S. McCain, Little Rock; J. H. Meek, Fordyce, and J. L. Longine, Arkadelphia. Among the representatives of Ford, Bacon & Davis, New York, N. Y., on the board of directors of the company, was William von Phul, now vice-president and general manager of the United Railroads, San Francisco, Cal. The property of the company consists of approximately 9½ miles of electric railway, an electric light and power plant, water pumping station and reservoirs, with complete distribution system for both electric and water departments.

Pittsburgh & Butler Railway, Pittsburgh, Pa.—The property of the Pittsburgh & Butler Railway is advertised to be sold under foreclosure at Pittsburgh on May 9. The company was placed in the hands of the Pittsburgh Trust Company on Jan. 2, 1917, as receiver, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 6, page 53.

Public Utilities Company, Evansville, Ind.—The Public Utilities Company has assumed the property of the Evansville Public Service Company and is now operating the city street railway lines, the interurban line to Princeton, Ind., and the local electric lighting and gas plants, having received the sanction of the Indiana Public Service Commission to the merger.

Quebec Railway, Light & Power Company, Quebec, Que.—Justice Cassils at Ottawa on Jan. 24 handed down an opinion regarding the valuation of the Quebec & Saguenay Railway and other properties of the Quebec Railway, Light & Power Company which the Dominion Government is proposing to buy. The press reports of the finding indicated that the court inclined to the opinion that total deductions which would aggregate several million dollars should be made from the cost of the roads. A statement made in behalf of the company said that there was no ground for the interpretation of the decision as a conclusive decision adverse to the company's contentions. As a matter of fact, the deliverance is viewed by the company as favorable in the sense that all ambiguity or doubt as to the intentions of the Government in regard to the purchase must now be removed.

Salt Lake, Garfield & Western Railway, Salt Lake City, Utah.—C. F. Childs & Company, Chicago, Ill., and New York, N. Y., are offering at price to yield 5.75 per cent $300,000 of first mortgage 6 per cent gold bonds of the Salt Lake, Garfield & Western Railway dated Sept. 1, 1916, and due serially from 1919 to 1941. The company is the successor to the Salt Lake & Los Angeles Railroad, 17 miles long. The proceeds of the issue will be spent to extend the line from Saltair to Garfield, 3 miles; to electrify the entire system; to equip the road with new and modern electric rolling stock. Any residue will be applied to liquidating indebtedness. The plans for electrification were reviewed briefly in the ELECTRIC RAILWAY JOURNAL of Feb. 10, page 263.

Sandpoint & Interurban Railway, Ltd., Sandpoint, Idaho.—At a recent meeting of the stockholders of the Sandpoint & Interurban Railway, Ltd., the directors were instructed to accept the offer made by Albert Filson, president and manager of the company, of $13,000 for the entire holdings of the company, with the exception of the office building at Main and Second Avenues, which is occupied as a depot. The holdings include 6 miles of track, five electric cars and other equipment.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio.—The report prepared by the expert appointed by the court to inquire into the financial affairs of the Sandusky, Norwalk & Mansfield Electric Railway is reported to be ready for presentation to Judge John M. Killits of the District Court of the United States for the Northern District of Ohio at Toledo. A hearing will be held soon after the report is submitted, and it is expected that the details will all be arranged so that the property can be offered for sale under foreclosure by April 15. It is anticipated that the upset price will be fixed at $275,000. The road was placed in operation in 1905. In 1911 it was placed in the hands of Wilbur Hoyt, C. P. Brooks and George B. Dusenberry as receivers on the application of the holders of the $600,000 of first mortgage bonds, the interest on which was in default. On Nov. 6, 1912, C. G. Taylor was appointed receiver of the company. The company has outstanding $360,000 of common stock, $240,000 of non-cumulative preferred stock, and $600,000 of first mortgage bonds. It operates 22 miles of track between Norwalk and Plymouth, built over private right-of-way except in cities, where the franchises run for twenty-five years from 1904. On July 1, 1913, the Plymouth & Shelby Traction Company, controlled by the Sandusky, Norwalk & Mansfield Electric Railway and operating 9 miles of track, was released from the receivership.

San Jose (Cal.) Railroads.—The California Railroad Commission has issued an order dismissing the application of the San Jose Railroads for authority to buy $50,000 of San Jose & Alum Rock Railway bonds and $200,000 of San Jose & Santa Clara Railroad bonds and to refund this $250,000 of bonds by issuing to the Southern Pacific Company $250,000 of San Jose & Santa Clara County Railroad bonds. The commission held that permission from it in this instance was unnecessary.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—A. H. MacAdams, J. H. Scholl, Murtha Quinn and George F. Hayes, Philadelphia, have been elected directors of the Slate Belt Electric Street Railway to succeed Milton Flory and Charles N. Miller, Bangor; E. A. Speer, Pen Argyl, and John A. Miller, Nazareth. Mr. MacAdams has been elected president of the company to succeed C. H. Latta. Mr. Schneebeli, who has been secretary and treasurer, continues as secretary, but Thomas J. Ryan, Philadelphia, becomes treasurer of the company.

Stroudsburg (Pa.) Passenger Railway.—The Stroudsburg Passenger Railway has been purchased by the same interests that control the Stroudsburg, Water Gap & Portland Railway. The property will be transferred on April 1. The Stroudsburg Passenger Railway operates 2.5 miles of line connecting Stroudsburg and East Stroudsburg. The Stroudsburg, Water Gap & Portland Railway operates 10 miles of line connecting Stroudsburg, Delaware Water Gap and Portland.

Tacoma (Wash.) Municipal Railway.—According to a report made by Controller Fred Shoemaker to Mayor A. V. Fawcett, Tacoma, the 1-mile municipal railway operated under lease by the Tacoma Railway & Power Company, after running into a deficit of $3,912 during the year 1915, shows a profit for 1916 of $962. The gain appears after deducting 4 per cent for the cost of construction paid the city and 5 per cent interest on the investment allowed the Tacoma Railway & Power Company. The agreement under which the line is run provides that the profits shall be divided equally between the city and the company. Before there can be any such division, however, the 1915 deficit must be charged off.

Tidewater Southern Railway, Stockton, Cal.—The Western Pacific Railroad has filed with the California Railroad Commission an application for authority to buy 1,201,000 shares of the capital stock of the Tidewater Southern Railway in order to extend the Tidewater lines and to develop its freight and passenger traffic so that the interchange between the Western Pacific and the Tidewater company may be increased. The Tidewater lines extend from Stockton and Modesto to Turlock, and connect with the Western Pacific at Stockton. Last October the Tidewater company applied to the commission for authority to make a new entrance into Stockton by using the tracks of the Western Pacific Railroad to the crossing of the Santa Fé line, and thence into Stockton by the Stockton Electric Railway. The Tidewater company also asked for permission to extend its line from Hatch, Stanislaus County, to Erwin City, Merced County, 8 miles. A hearing was held upon the new Stockton entrance, but a decision has not yet been made.

Tulsa (Okla.) Traction Company.—The Tulsa Traction Company has filed an amendment to its charter at Oklahoma City, changing its name to the Oklahoma Union Railway, and increasing its capital from $100,000 to $600,000.

Dividends Declared

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.
Detroit (Mich.) United Railway, quarterly, 1¾ per cent.
Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec.,		'16	$73,741	*$41,805	$31,936	$18,654	$13,282
1 "	"	'15	67,306	*34,478	32,828	17,606	15,222
12 "	"	'16	829,988	*460,877	369,111	214,916	154,195
12 "	"	'15	788,832	*400,510	388,322	212,495	175,827

CENTRAL MISSISSIPPI VALLEY ELECTRIC PROPERTIES, KEOKUK, IOWA.

1m., Dec.,		'16	$26,954	*$17,959	$8,995	$2,072	$6,923
1 "	"	'15	26,237	*15,489	10,748	1,897	8,851
12 "	"	'16	294,893	*197,994	96,899	23,827	73,072
12 "	"	15	282,177	*187,512	94,665	22,455	72,210

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Dec.,		'16	$110,760	*$88,869	$21,891	$30,159	†$8,268
1 "	"	'15	105,343	*63,836	41,507	29,784	11,723
12 "	"	'16	1,235,623	*823,444	412,179	356,324	55,855
12 "	"	'15	1,087,344	*727,731	359,613	357,762	1,851

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Dec.,		'16	$84,383	*$30,166	$54,217	$28,527	$25,690
1 "	"	'15	70,226	*26,866	43,360	28,679	14,681
12 "	"	'16	881,353	*351,233	530,120	343,574	186,546
12 "	"	'16	721,217	*322,040	399,177	344,544	54,633

DALLAS (TEX.) ELECTRIC COMPANY

1m., Dec.,		'16	$198,746	*$103,197	$95,549	$40,919	$54,630
1 "	"	'15	168,163	*101,577	66,586	35,861	‡31,925
12 "	"	'16	1,990,420	*1,207,612	782,808	451,887	‡349,064
12 "	"	'15	1,828,488	*1,120,174	708,314	404,561	‡304,953

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Dec.,		'16	$296,312	*$184,854	$111,458	$63,749	$47,709
1 "	"	'15	238,667	*141,274	97,393	62,982	34,411
12 "	"	'16	3,027,699	*1,820,774	1,206,925	755,033	451,892
12 "	"	'15	2,466,969	*1,473,592	993,377	756,315	237,062

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Dec.,		'16	$75,471	*$39,710	$35,761	$9,625	$26,136
1 "	"	'15	69,453	*35,373	34,080	9,172	24,908
12 "	"	'16	826,313	*444,422	381,891	107,698	274,193
12 "	"	'15	723,091	*386,447	336,644	105,562	231,082

EL PASO (TEX.) ELECTRIC COMPANY

1m., Dec.,		'16	$117,342	*$59,202	$58,140	$5,335	$52,805
1 "	"	'15	101,469	*46,508	54,961	4,180	50,781
12 "	"	'16	1,110,717	*658,564	452,153	59,127	393,026
12 "	"	'15	981,888	*521,059	460,829	50,368	410,461

KEY WEST (FLA.) ELECTRIC COMPANY

1m., Dec.,		'16	$11,708	*$7,226	$4,482	$2,525	$1,957
1 "	"	'15	9,504	*6,619	2,885	2,559	326
12 "	"	'16	116,371	*77,547	38,824	30,219	8,605
12 "	"	'15	112,840	*82,040	30,800	30,595	205

NEW YORK & STAMFORD RAILWAY, PORTCHESTER, N. Y.

1m., Dec.,		'16	$25,295	*$24,709	$586	$7,987	‡†$7,366
1 "	"	'15	23,649	*24,166	†517	7,994	‡†8,472
6 "	"	'16	189,564	*152,315	37,249	47,923	‡†10,371
6 "	"	'15	210,310	*159,500	50,810	47,998	‡3,166

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., Dec.,		'16	$28,281	*$20,659	$7,622	$7,268	$354
1 "	"	'15	28,944	*15,691	13,253	7,438	5,815
12 "	"	'16	310,962	$213,600	97,362	86,676	10,686
12 "	"	'15	289,155	$179,025	110,130	91,269	18,861

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Dec.,		'16	$788,880	*$443,296	$345,584	$184,923	$160,661
1 "	"	'15	699,702	*414,999	284,703	182,417	102,286
12 "	"	'16	8,107,371	*5,120,995	2,986,376	2,212,982	773,394
12 "	"	'15	7,559,582	*4,754,763	2,804,819	2,179,984	624,835

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Dec.,		'16	$80,096	*$49,649	$30,447	$23,986	$6,461
1 "	"	'15	68,902	*44,271	24,631	23,329	1,302
12 "	"	'16	826,093	*553,695	272,398	282,756	†10,358
12 "	"	'15	794,213	*518,488	275,725	278,491	†2,766

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., Dec.,		'16	$14,763	$16,249	†$1,486	$2,018	‡†$3,480
1 "	"	'15	17,513	20,514	†3,001	1,723	‡†4,692
6 "	"	'16	107,199	115,022	†7,823	11,473	‡†19 138
6 "	"	'15	133,742	129,734	4,008	9,840	‡†5,648

* Includes taxes. † Deficit. ‡ Includes non-operating income.

Traffic and Transportation

Indianapolis Traffic Increasing

1916 Interurban Passenger and Freight Traffic Handled at Indianapolis Traction Terminal Offsets 1915 Decrease

The following tables compiled by the Indianapolis Traction & Terminal Company, relating to the interurban passenger and freight traffic handled through the traction terminal station at Indianapolis, show an increase of almost 600,000 passengers carried during the year 1916 as compared with 1915. The year 1915, however, did not show the usual increase, due to business depression, as will be noted from the table showing the comparison for the several years but the business developed during the year 1916 more than offset this decrease. In order to estimate the number of visitors brought to the city of Indianapolis by the interurban lines, it is considered, theoretically, that each person makes a round trip, and on this basis the total number of people who visited Indianapolis by the electric lines in 1916 would be one-half of the total passengers carried, or 3,604,274, an increase of nearly 100,000 over the year 1914. The total of 7,208,747 passengers handled by the interurban lines entering the city of Indianapolis during the year 1916 is more than twice the population of the State of Indiana, which is approximately 3,000,000. The number of passengers entering and leaving Indianapolis every two weeks is more than equal to the total population of the city of Indianapolis, which is about 260,000.

DATES WHEN INTERURBAN LINES COMMENCED OPERATING INTO INDIANAPOLIS

Indianapolis, Columbus & Southern Traction Company	Jan. 1, 1900
T. H. I. & E.—Eastern Division	June 17, 1900
Union Traction Company—Muncie Division	Jan. 1, 1901
T. H. I. & E.—Martinsville Division	Aug. 2, 1902
T. H. I. & E.—Brazil Division	Sept. 15, 1902
Indianapolis & Cincinnati—Shelbyville Division	Sept. 12, 1902
T. H. I. & E.—Northwestern Division	Oct. 9, 1903
Union Traction Company—Logansport Division	Dec. 3, 1903
Indianapolis & Cincinnati—Rushville Division	July, 1905
T. H. I. & E.—Danville Division	Sept. 1, 1906
T. H. I. & E.—Crawfordsville Division	July 4, 1907
Union Traction Company—Newcastle Division	June 29, 1910
Beech Grove Traction Company	March, 1911

The total number of passengers carried since 1900 was as follows: 1900, 377,761; 1901, 955,554; 1902, 1,523,411; 1903, 2,347,936; 1904, 3,274,654; 1905, 3,881,382; 1906, 4,469,982; 1907, 5,032,677; 1908, 4,979,371; 1909, 5,156,906; 1910, 5,736,272; 1911, 6,279,822; 1912, 6,431,714; 1913, 6,524,366; 1914, 7,012,763; 1915, 6,629,642; 1916, 7,208,747.

INDIANAPOLIS TRACTION & TERMINAL COMPANY—TOTAL NUMBER INTERURBAN AND SUBURBAN PASSENGERS ARRIVING AND DEPARTING—INDIANAPOLIS

Month	Passengers, 1916	Passengers, 1915	Month	Passengers, 1916	Passengers, 1915
January	459,614	473,428	October	600,015	582,016
February	467,910	462,977	November	590,609	514,255
March	533,200	508,172	December	638,126	511,771
April	542,183	520,528			
May	643,625	622,531	Total	7,208,747	6,629,642
June	642,151	580,984			
July	767,669	629,694	Average per day	19,696	18,163
August	692,166	624,891			
September	631,479	598,395			

INDIANAPOLIS TRACTION & TERMINAL COMPANY—TOTAL NUMBER INTERURBAN AND SUBURBAN CARS ARRIVING AND DEPARTING—INDIANAPOLIS

	1916			1915		
Month	Passenger Cars	Freight Cars	Total	Passenger Cars	Freight Cars	Total
January	19,260	1,987	21,247	19,494	2,112	21,606
February	18,049	1,890	19,939	17,977	1,962	19,939
March	19,947	2,217	22,164	19,865	2,213	22,078
April	19,644	2,071	21,715	19,806	2,151	21,957
May	22,048	2,120	24,168	23,039	2,117	25,156
June	22,630	2,215	24,845	22,137	2,196	24,333
July	25,033	2,290	27,323	23,616	2,183	25,799
August	23,735	2,375	26,110	23,577	2,210	25,787
September	21,631	2,191	23,822	22,211	2,084	24,295
October	20,912	2,318	23,230	20,396	2,156	22,552
November	19,967	2,157	22,124	19,470	2,042	21,512
December	21,173	2,149	23,322	19,915	2,085	22,000
Total	254,029	25,980	280,009	251,503	25,511	277,014
Average per day	694	71	765	689	70	759

Hearing on Seven-Cent Fares

Small Massachusetts Road Seeks to Establish This Unit Instead of Present Five-Cent Rate

An appeal for the establishment of a 7-cent fare unit on the Norwood, Canton & Sharon Street Railway was heard by the Public Service Commission of Massachusetts recently at Boston. The company was represented by Robert Holt, of Gaston, Snow & Saltonstall, Boston. The road is only 6.25 miles long. It consists of two disconnected parts separated by the Blue Hill Street Railway. The company is managed by the Norfolk & Bristol Street Railway at an expense of $200 a year and it purchases electricity from the Blue Hill company at the rate of 2.75 cents per kilowatt-hour. The present management began the operation of the road in 1913 and in the three years following a net divisible income of $2,000 was realized. This, however, was wiped out in 1916 and there was a deficit of more than $5,000 in the latter year. The present fare unit is 5 cents. Only two cars are required to maintain hourly service on the company's lines.

Mr. Holt said that the northerly section of the road was located wholly in the town of Norwood, service being rendered from Norwood Center to Canton. This section of the road is operated by platform men employed by the Blue Hill Street Railway, which pays the company 1½ cents per car-mile for the use of the car on that portion of its tracks between Washington Street, Canton, and the Norwood, Canton & Sharon tracks extending into Norwood. The Blue Hill company pays these platform men for the time that they are on its tracks. Only four men are required for this service and each road meets about half their compensation. The southerly section of the road is about 3.3 miles long. It is wholly in Sharon, and service is rendered between Sharon Heights and the Canton-Sharon town line. There are no through cars running into Canton and no transfers are issued to the Blue Hill cars. The road has one carhouse, located at the Sharon end, and the Blue Hill company cares for the rolling stock maintenance. The operating revenue of the company in 1916 was $10,875 and the operating expenses were $14,735. Last year the company ran 68,094 revenue car-miles. The operating revenue per car-mile was 15.97 cents, the lowest in Massachusetts. The passengers per car-mile averaged 3.2 compared with 5.9 for all companies in the State, and the total revenue passengers carried was 217,474. The average operating revenue per car-mile for all companies in Massachusetts in 1916 was 30.75 cents. The company proposes to sell tickets in strips of ten for 65 cents and sixteen for $1. Mr. Holt pointed out that it had been impossible to maintain the track properly with the revenue received. It is estimated that the establishment of a 7-cent fare unit, if all the present patronage is retained, will increase the company's income by $3,233 a year. Following the presentation of the company's case, J. A. Halloran, for the selectmen of Norwood, stated that the town authorities are not in opposition to the establishment of the 7-cent fare unit, even though the rate may exceed that in and about Norwood on other street railway lines. One-man cars are to be considered for the road according to M. A. Cavanaugh, general manager of the Norfolk & Bristol Street Railway.

Bus Line Privilege Not a Franchise

The municipal consent to the operation of stage lines within a city required by the laws of New York is not a franchise in the sense of the clause of the second class cities law, requiring that franchises must be disposed of at public auction, according to a decision recently made by the Public Service Commission of New York, Second District, in the matter of the application of the Troy Auto Car Company, Inc., for a certificate to operate a bus line in the city of Troy, N. Y. The phrase "public convenience and necessity," according to the opinion, is to be taken as an entirety. It is not necessary, as a precedent to the granting of a certificate, that the commission should find that the proposed stage line is strictly a necessity as well as a convenience. Public convenience and necessity exists when the proposed facility will meet a reasonable want of the public and supply a need, if existing facilities, while in a sense sufficient, do not adequately supply that need.

Buffalo Receives Billy Sunday

International Railway Handles Promptly Thousands Who Hit the Salvationist's Sawdust Trail

Special service has been provided by the International Railway, Buffalo, N. Y., for the crowds which are attending the Billy Sunday revival services at the tabernacle on the grounds of the Buffalo International League baseball park. J. W. Andrews, former superintendent of the Buffalo & Lockport and Lockport & Olcott divisions of the International Railway, has been assigned to the special duty of directing the street car movement to and from the tabernacle. He is assisted by a corps of uniformed supervisors and trainmen. The baseball park is located within two short blocks of the Cold Spring station of the International Railway and car tracks are on three sides of the big frame tabernacle, which has a seating capacity for 14,500 persons. Five car lines pass the structure and the South Park-West Utica line is routed around the baseball park before and after the services. Cars for all lines are parked on dead tracks on the Masten Street side of the building for the accommodation of the tabernacle crowds after the meetings. All chartered and special interurban cars start from the Cold Spring station, two short blocks from the park.

A system of electric signals similar to that adopted at the Kansas City revival is used by Superintendent Andrews for starting the cars after each service. An electric signal from the desk of George Sunday, Billy Sunday's business manager, in the tabernacle to Mr. Andrew's office in the rear of the building gives the superintendent advance information as to when each meeting will end. At Mr. Andrews' station in the tabernacle there are electric signals connected with large gongs at Michigan and East Ferry Streets, at Main and East Ferry Streets and at the Cold Spring station. By a code of signals Mr. Andrews starts the cars to keep pace with the movement of the crowds. He also receives ample advance notice of any changes in the arrangements at any meeting. A special telephone connects the tabernacle with the superintendent of the Cold Springs carhouse.

The rapidity with which the crowds have been handled during the first two weeks of Mr. Sunday's campaign has been favorably commented upon by Mr. Sunday and the newspapers. At the evening services almost 14,000 persons have been loaded into cars and the streets cleared of traffic within fifteen minutes. A squad of policemen is co-operating with the railway in directing the movement of the crowds.

Substitute Petition Presented

Bay State Street Railway Files New Schedule of Fares for Nashua, N. H.

The Bay State Street Railway, Boston, Mass., has withdrawn its original petition for a general increase of fares in Nashua, N. H., from 5 to 6 cents and including the changing of various Nashua-Hudson fare limits, and substituted a new detail of fare increase and transfer changes as follows:

Five-cent cash fare raised to 6 cents including fares on cars operated by agreement with Manchester Street Railway.

Sale of nine tickets for 50 cents, good only within Nashua transfer limits as modified.

Withdrawal of all reduced-rate tickets except school tickets sold at one-half regular rates.

Changes in local transfer privileges.

Nashua-State Line Route No. 111. Local transfer limit Stewarts corner changed to the junction of county and Pelham roads, a reduction in length of ride of 2.88 miles; distance from transfer station, Nashua, 2.46 miles.

Changes in fare collection points:

Nashua-State Line Route No. 111.—Fare-collection point established at the junction of county and Pelham roads, Hudson, making an additional fare zone between end of route Palm Street, Nashua, and Stewarts corner, Hudson; also between end of route and New Hampshire-Massachusetts State line, distance from end of route 3.04 miles, re-

ducing length of ride 2.88 miles; length of zone 2.88 miles.

The Public Service Commission of New Hampshire has suspended the prophesied new schedule until April 1 pending the investigation which it proposes to conduct into the matter.

Safety Program Adopted

Commission, Electric Railways and Auto Association Agree Upon Final Program, Including Legislation

A final program, including legislation to be asked for this year, for greater safety at the grade crossings of highways and electric railways was adopted at the offices of the Public Service Commission for the Second District of New York at Albany on Feb. 14 by the conference which the commission has been engaged in for nearly a year with representatives of the electric railways and the automobile clubs of the State.

The program includes the endowment of the commission with power to order the obstructions to vision at these grade crossings removed and the expense apportioned equitably among the State, municipality and the railway, the equipment of all crossings with standard signs and warnings lighted at night and the erection of a standard sign at a distance of 500 ft. from the crossing on the highway, a requirement that all whistles or other signals on electric cars be sounded up to the time the car or train reaches the crossing, that motorists be compelled to approach crossings with their cars so under control that they can bring them to a stop before crossing, that all vehicles be compelled to carry light showing in all directions, and that the work of the committee to encourage education and publicity against the dangers at these crossings be continued.

The executive committee of the conference, of which Seymour Van Santvoord of the commission is chairman, will take charge of the presentation of these conclusions, with suitable bills, to the Legislature.

Among those at the meeting on Feb. 14 were H. B. Weatherwax, of the Hudson Valley Railway; H. A. Bullock, of the Brooklyn Rapid Transit Company; H. A. Abell, of the Schenectady Railway; M. D. Kilbride, of the New York State Railways; C. B. Hammond, of the Elmira, Corning & Waverly Traction Company; A. W. Seaman, of the New York State Automobile Association; C. L. Addison, of the Long Island Railroad; W. H. Collins, of the Fonda, Johnstown & Gloversville Railroad; I. M. Beatty, of the Peekskill Light & Railroad Company; William O. Wood, of the New York & Queens County Railway, and James P. Barnes, general manager of the Buffalo, Lockport & Rochester Railway.

P. A. Y. E. for Denver.—The Denver (Col.) Tramway is preparing to install the center-entrance P-A-Y-E on its entire system. The first car of this type in Denver was placed in service on Jan. 29.

Traffic Survey in Flint, Mich.—B. J. Arnold has been engaged to make a traffic survey by the city authorities of Flint, Mich. The problem includes a study of steam railroad terminals, street railway traffic and entrance for interurban lines. The street railway lines in Flint are operated by the Detroit United Railway.

City Regulation for Intra-Urban Jitneys.—The Texas Highway Commission bill, which provides for the levying of a tax on all motor vehicles and placing them under State supervision, has been amended by a clause specifically providing that cities and towns in the State of Texas shall have authority to regulate jitneys that operate within their limits.

Skip-Stop Proposed for Norfolk.—The Virginia Railway & Power Company has decided to use the skip-stop system in Norfolk, if permitted to do so by the City Council. A survey is being made of the entire territory in which the skip-stop system will be in effect in that city and the proposition will be brought to the attention of the Council as soon as all of the data needed have been completed by the company.

West Penn Magazine Revived.—The West Penn Railways, Pittsburgh, Pa., in response to repeated requests, have resumed for their employees the publication of the *West Penn Bulletin*. The last number was issued in the latter part of 1914, the general business depression existing at that time requiring its sacrifice in the interests of economy. The first copy of this resumed monthly magazine is dated October, 1916.

California Jitneys Asked to Report to State.—The Railroad Commission of California complying with the recent decision of the Supreme Court of that State placing jitney buses under its jurisdiction, has sent to nearly 1000 freight and passenger and stage lines in the State blank forms for their filing with the commission schedules of rates, fares, classifications, time schedules, routes, rules and regulations.

Kentucky Company Courts Industrials.—The Owensboro (Ky.) City Railroad is co-operating with the city's business interests in its efforts to bring new industries to the city and hold them there. In connection with the establishment of a new chair factory some distance out, the company is repairing an old track laid to a convenient point and will replace a trolley wire, probably also constructing a waiting station at the end of the line. Cars will run to the terminus in the morning and in the evening to haul the employees whose homes are in the city.

Rise in Dallas Valuations.—Valuations of public utilities in Dallas, Tex., recently submitted to the City Commission, show an average increase of 111 per cent over the valuations of 1916. The street car properties east of the Trinity River, or those in the city of Dallas proper, are valued at $8,500,000, the valuation agreed on in the reorganization plan of the city and the Strickland-Hobson interests. The property of the Northern Texas Traction Company, including the Oak Cliff lines, was valued at $1,684,000, an increase of 95 per cent over the 1916 valuation.

Bids Opened for Municipal Railway Buses.—Five bids for motor buses for use in the transportation of passengers in conjunction with the Municipal Railway System of San Francisco, Cal., were opened on Jan. 31 by the Board of Public Works. The lowest of these bids is as follows: Furnishing and delivering complete, $4,375; maintenance for 125,000 miles, $1,875; turn in allowance (chassis), 125,000 miles, $500; weight of bus, complete without load, 6800 lb.; rated power, S. A. E., 28.8; wheelbase, 172 in.; length of chassis, overall, 20 ft. 6 in.; rated capacity of chassis, 6000 lb.

A Sermon Around a Commission Decision.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., has republished in *Electrogram*, circulated by it among the public, extracts of the decision of the Public Service Commission of that State in the Spokane traffic case with comment of its own on the decision. This is the decision in which the commission said that if no relief were found for the conditions in Spokane the inevitable would happen, namely, "the trolley will come down and the rails will come up." This decision was referred to at length in the ELECTRIC RAILWAY JOURNAL for Jan. 27, page 184.

Portland Company Simplifies Its Transfers.—The Portland Railway, Light & Power Company, Portland, Ore., has recently issued new transfers, which are somewhat simpler than the former style, in that the little "P. M." coupon has been eliminated and hereafter a transfer issued between noon and midnight will be punched, but not between midnight and noon. The line from which the transfer is issued is indicated by the initials of that line, instead of by color of the transfer, as heretofore. The cost of the new transfers will represent a slight saving over the old type. This railway company issues approximately 60,000 transfers a day, or about 22,000,000 a year.

Interborough Traffic Sets New Records.—Planned for a daily capacity of 600,000 persons, the average subway riding of the Interborough Rapid Transit Company has risen steadily to 1,541,832, the record set on Dec. 18. On that day also the elevated system of the same company reached its high-water mark of 1,252,063. Another record was broken in the travel during the week before Christmas. Figures for the seven days were more than 2,295,000

greater than for the Christmas week of the previous year. From 1,069,000 in September, 1916, the daily average of passengers on the subway has mounted steadily higher. In November it was 1,199,000 and December traffic reached 1,246,563.

I. T. S. Employees Render Vote of Confidence.—The employees of the Chicago, Ottawa & Peoria Railway Company, a subsidiary of the Illinois Traction System, have given the officials of the road a unanimous vote of confidence. This action followed a long discussion of the wage question. The satisfactory settlement of the problem, with the unanimous vote of confidence, is indicative of the cordial relations which now prevail between the men and the officials of this company. According to the agreement the first and second year men are allowed 2½-cent increase per hour while all those who have been employed by the company for two years will receive a flat increase of 4 cents an hour.

Louisville Semaphore Accident Involves Traffic Problems.—Special consideration at a date to be selected has been ordered by the Jefferson Circuit Court at Louisville, Ky., of the question as to whether the city, in maintaining semaphores at certain street intersections, has a right to use semaphores the arms of which are on a level with the windows of the street cars. The order is in connection with the trial of a suit involving injuries to a child which stuck its head out the window and suffered a gash in the head when it came in contact with the semaphore. Both the city and the Louisville Railway are defendants in the case, and both contend that it was the duty of the father to prevent the child from sticking his head out of the window even though it was open.

Safety Film Available.—Realizing the value and success of the motion pictures "The Price of Thoughtlessness" and "The Cost of Carelessness," both of which are particularly adapted for public safety work and the training of transportation department employees, the railway by which they were developed has consented to allow the pictures to be distributed through the National Safety Council by Scott & Van Altena, Inc., New York, N. Y., and the pictures can now be procured by any company or civic organization conducting or desiring to conduct safety or educational work. The consent was necessary, as both the motion pictures and stereopticon slides are copyrighted. The scenes portray actual incidents and accidents that may and do occur every day and are in every way true to life. The highly dramatic features of the motion picture of the present day have been eliminated, and nothing is left but those features which may be desired to make safety and educational endeavor a thorough and lasting success.

Buffalo Advertising Brings Results.—The International Railway, Buffalo, N. Y., is continuing its campaign of newspaper advertising. As stated previously in the ELECTRIC RAILWAY JOURNAL the cars of the company were placarded with posters asking for constructive criticism. As a result many valuable suggestions have been received and a number so made have already been adopted. Others are being considered for future use. In one of the first of the series of advertisements E. G. Connette, president of the company, replied to the complaint regarding the matter of heat. Another display advertisement of the company set forth its reasons for turning back cars before they reached their destination. Other advertisements have told about the company's constructive policy in making improvements and about the causes of irregularities in service. The company published every day a list of all delays of more than ten minutes' duration, giving the cause of the delay, the lines affected and the time. In its recent advertisement dealing with expenditures the company said that during the last five years it had spent $8,869,067 for new construction, reconstruction of tracks, paving of tracks, rolling stock, etc. These expenditures were tabulated by years. The figures were commented on favorably in an editorial in a recent issue of the *Courier*, the largest morning paper in Buffalo. Several of the other Buffalo daily newspapers have also commented favorably, in editorials which have appeared in recent issues, on the company's policy of taking the public into its confidence.

Personal Mention

S. W. Haberle has succeeded J. H. Morris as chief dispatcher in the Illinois Traction System.

P. P. Griffin has been elected vice-president of the Susquehanna Traction Company, Lock Haven, Pa.

W. E. Skead has been appointed city purchasing agent of the Brandon (Manitoba) Municipal Railway.

C. D. Smythe has been appointed commercial agent of the Joplin & Pittsburg Railway, Pittsburg, Kan.

B. F. Yeakee has been appointed electrical engineer of the Glendale & Montrose Railway, Glendale, Cal.

R. B. Campbell has been elected secretary of the Arkansas Valley Interurban Railway, Wichita, Kan.

B. C. Long has been appointed master mechanic of the Muskogee (Okla.) Electric Traction Company.

James Wilson has been elected treasurer of the Shawinigan Falls Terminal Railway, Montreal, Quebec.

H. G. Budden has been elected secretary of the Shawinigan Falls Terminal Railway, Montreal, Quebec.

Mary A. Landon has been elected president of the Woodstock & Sycamore Traction Company, Genoa, Ill.

R. B. Shields has been appointed chief power station engineer of the Wheeling (W. Va.) Traction Company.

J. A. Werner has been elected first vice-president of the Chicago, Aurora & De Kalb Railroad, Aurora, Ill.

W. E. Page has been appointed engineer overhead construction of the Sand Springs Railway, Tulsa, Okla.

J. H. Schuch has been appointed chief engineer of the Butte, Anaconda & Pacific Railway, Anaconda, Mont.

Roy Carmien has been appointed local purchasing agent Alaska Gastineau Mining Company, Thane, Alaska.

E. W. Shell has been elected treasurer of the Trans-St. Mary's Traction Company, Sault Ste. Marie, Ontario.

G. C. Starkweather has been appointed superintendent of the Hoboken Manufacturers' Railroad, Hoboken, N. J.

H. E. Cox has been appointed chief engineer Birmingham Railway, Light & Power Company, Birmingham, Ala.

I. W. Ross has been appointed general manager Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.

E. L. King has been appointed general manager of the Lee County Central Electric Railway, Lee Center, Ill.

W. F. Fetherolf has been appointed general freight agent of the Lehigh Valley Transit Company, Allentown, Pa.

J. M. Mellor has been appointed master mechanic of the Northern Massachusetts Street Railway, Athol, Mass.

L. E. Rader has been appointed chief power station engineer of the Warren (Pa.) Street Railway, at Stoneham, Pa.

A. Keller has been appointed chief power station engineer of the Warren & Jamestown Street Railway, at Stoneham, Pa.

Charles Krial has been appointed roadmaster of the Philadelphia & Easton Electric Railway, with office at Revere, Pa.

H. H. Wood has been made assistant to the general superintendent of the Central Illinois Public Service Company, Mattoon, Ill.

R. D. Jones has been appointed claim agent for the Reading Transit & Light Company, Reading, Pa., succeeding Rex D. Billings.

B. J. Arnold of Chicago has been commissioned as major of engineers in the Officers' Reserve Corps of the Army of the United States.

C. S. Head has been appointed superintendent of maintenance of way of the Indiana Railways & Light Company, Kokomo, Ind., to succeed G. H. Losey.

W. J. Ginnivan has resigned as manager and purchasing agent of the railway department of the Montgomery Light & Traction Company, Montgomery, Ala.

H. F. Dicke, for five years general manager of the Boise Valley Traction Company, Boise, Idaho, has been appointed as general manager of the Utah Light & Traction Company, Salt Lake City, Utah, succeeding H. L. Beach.

Mrs. Melodia Blackmar Jones was elected president of the Niagara Gorge Railway, Buffalo, N. Y., at the annual meeting of directors on Feb. 2. Mrs. Jones succeeds her husband, the late Capt. Joseph T. Jones. The Niagara Gorge Railway owns and operates the Great Gorge Route from Lewiston to Niagara Falls, N. Y., along the American gorge of the Niagara River.

R. D. Voshall has been appointed superintendent of equipment of the Birmingham Railway Light & Power Company, Birmingham, Ala., to succeed R. A. Riley. For the past eight years Mr. Voshall has been connected with the Tidewater Power Company, Wilmington, N. C., for five years as master mechanic and for three years in charge of the railway department. Previously he served with the New York (N. Y.) Railways and the Illinois Traction System.

W. F. M. Goss, dean of the College of Engineering, University of Illinois, has been elected president of the Railway Car Manufacturing Association of New York, and will take up his new work as soon as released. Mr. Goss was dean of engineering at Purdue University from 1879 to 1907, when he went to Illinois. He was employed as chief engineer by the Chicago Association of Commerce in 1915 to prepare a report on smoke abatement and railway terminal electrification in Chicago.

Ward Hubbard, formerly chief engineer of the Rockford & Interurban Railway, Rockford, Ill., has resigned to become engineer of maintenance of way of the Bay State Street Railway, Boston, Mass. He entered the employ of the Union Traction Company, Anderson, Ind., in 1903 as a rodman, and was employed in that company until 1911, serving successively as timekeeper, foreman, chief clerk and division engineer. In 1911 he became chief engineer of the Rockford & Interurban Railway, coming to Boston to take up his present work Feb. 1, 1917.

Thomas Dreier has been appointed assistant to the president of the Bay State Street Railway, Boston, Mass. Mr. Dreier has been engaged in editorial work for about twelve years. For more than two years he was editor of *Associated Advertising*, the official magazine of the Associated Advertising Clubs of the World, and in the interests of better advertising has spoken before commercial organizations in nearly all the large cities of the country. He is the author of several books and is a frequent contributor to magazines. Mr. Dreier is to be the principal speaker at the meeting of the Massachusetts Street Railway Association at Youngs Hotel, Boston, Feb. 21.

H. L. Beach, general manager Utah Light & Traction Company, Salt Lake City, Utah, has tendered his resignation and will be transferred to the east by the interests controlling that property. Mr. Beach assumed the management of the Utah Light & Traction Company, which has 145 miles of track and 184 motor cars, about two years ago. Before going to Utah Mr. Beach had been associated for a short time with B. J. Arnold and previous to that for a long time was with the transportation department of the Chicago Railways Company, now a part of the Chicago Surface Lines. The Salt Lake *Herald-Republican*, in commenting on his resignation, says in a recent issue that his departure will be deeply regretted by the public. It adds that to operate a public utility to the entire satisfaction of its patrons is among those achievements commonly regarded as impossible, but that the public in Salt Lake City will be content if the service in the future will be as satisfactory as it has been in the past.

William T. Cobb, Rockland, Me., who as noted elsewhere, will address the members of the New England Street Railway Club at Boston on Feb. 22 on the subject "Public Relations," is unusually well fitted to discuss this subject from every possible viewpoint. He is a graduate of Bowdoin College, Brunswick, Me., Heidelberg University and the Harvard University Law School and is a member of the Maine Bar Association. About twenty years ago Mr. Cobb assisted in building the Rockland, Thomaston & Camden Street Railway and has been its president for many years. He was Governor of the State of Maine for four years, from 1904 to 1907, inclusive. He was one of the receivers of the Eastern Steamship Corporation, is a trustee of Bowdoin College and is president of the Maine Railways Light & Power Company, the Androscoggin Electric Company, the Oxford Electric Company and the Rockland, Thomaston & Camden Street Railway, besides being a director of several banking and financial institutions.

W. D. Ray, for the last two years vice-president and general manager of the Pennsylvania Utilities Company, Easton, Pa., which was recently sold by the Barstow interests, has tendered his resignation, effective April 1. Prior to coming to Easton, Mr. Ray was for four years vice-president and general manager of the Northern Indiana Gas & Electric properties operating in Hammond, Michigan City and other Indiana cities, and before that he served three years as commercial agent for the Sanitary District of Chicago. Mr. Ray's early years were spent as electrical engineer for several railroads in the Chicago territory, and later he became designing engineer for the old Standard Electric Company. During the Chicago World's Fair, Mr. Ray was connected with the Exposition's electrical department. At this period he collaborated with C. K. MacFadden in the book, "The Practical Application of Dynamo-Electric Machinery," a little volume which has appeared in many reprintings. From 1894 to 1897 he was superintendent of the Everett (Wash.) Electric Railway, returning to Chicago to handle electric-motor sales for the Lorain Steel Company. Later Mr. Ray had charge of the complete construction of two 75-mile electric railways in Michigan, and of the Grand Rapids-Muskegon third-rail road. During the past two years Mr. Ray has been in charge of the Pennsylvania Utilities Company, which furnishes electricity, gas and electric-railway service to a community of 100,000 people in Easton and neighboring towns.



W. D. RAY

Obituary

John Hickey, mechanical engineer of the Salt Lake & Utah Railroad, Salt Lake City, Utah, died on Feb. 3.

John J. Linden, one of the oldest employees on the Chicago (Ill.) Surface Lines, died on Jan. 17. He started with the company as a conductor thirty years ago and later became night foreman and superintendent. He was for many years general superintendent of the old Chicago Consolidated Traction Company. Later he went to Washington to become general manager of the Seattle, Renton & Southern Railway Company, but returned to Chicago about five years ago to take up his old work as superintendent at the North Side Lincoln station. At the time of his death he was on an indefinite furlough, owing to ill health.

Capt. R. S. Satterlee, vice-president of the Habirshaw Electric Cable Company, and ordnance officer on the staff of Major-General O'Ryan, National Guard, New York, is dead as the result of exposure connected with military duty. Captain Satterlee served in the Spanish War and later was appointed by Governor Roosevelt a first lieutenant in the Twelfth New York Regiment, and went to Cuba with that command and served in the Army of Occupation. On his return here he joined the Habirshaw Wire Company, of which he became president in 1911. Upon the reorganization of the company into the Habirshaw Electric Cable Company, Captain Satterlee became vice-president.

Legal Notes

Charters, Ordinances, Franchises

CALIFORNIA.—*Validity of Collateral Agreement as to Note.*

Where a stock subscription contract was executed in duplicate, the subscriber retaining one copy on which the corporation's agent indorsed an agreement to return the subscriber's note for his subscription if he were dissatisfied, and the corporation, within that time, before any stock was issued to him, refused to return the note upon being requested, the note was not enforceable against the subscriber by another party with notice of these facts, although the agent had not indorsed the agreement on the original subscription contract, filed with the company. The corporation had been fully organized before this subscription was made, and it did not appear that any subsequent creditor or later subscriber had been defrauded by reliance upon this subscription, or that this subscriber connived at or contemplated any secrecy in making the collateral agreement permitting cancellation, or that he knew that the corporation's agent failed to indorse the agreement upon the original subscription retained for the corporation files, whatever secrecy there was about the agreement being imparted to it by the corporation through its agent. (Tidewater Southern Ry. v. Vance, 160 Pacific Rep., 1097.)

GEORGIA.—*Assessments for Public Improvements.*

A street railway company which owns a 30-ft. right-of-way on the side of a street in a municipality is not exempt from assessment for a sanitary sewer in the street on which it abuts, on the ground that the railway company cannot receive any benefit from the improvement so long as its property is subjected to the present particular use. The case does not represent that class of assessment which the courts are warranted in preventing as representing "a manifest abuse of legislative authority." (Georgia Railway & Electric Co. v. City of Atlanta, 87 Southeastern Rep. 1058.)

IOWA.—*Right-of-way—Fee or Easement—Paving Charges.*

Where owners of land conveyed to a railway by deeds reading that they sold and quitclaimed to the road all their right, title, and interest in the land, not merely in the right-of-way, though each deed embodied a statement that the land was to be used for the construction and operation of a street railroad and that if in the future the land should be abandoned for such purpose it should revert to the grantor or the public, the road received a fee in the land. Hence a paving assessment against it could not be avoided on the theory that its interest in the land was merely an easement, since where an estate is conveyed subject only to a possibility of reverter, the grantee is the owner until the reverter takes place. (Des Moines City Railway v. City of Des Moines, 159 Northwestern Rep., 450.)

Liability for Negligence

INDIANA.—*Killing Stock—Presumption—Negligence.*

Negligence on the part of a street railway cannot be presumed from the mere fact that live stock is injured or killed by its car at a point where the statute does not require its tracks to be fenced. (Terre Haute, Indianapolis & Eastern Traction Co. v. Krause et al., 109 Northeastern Rep., 760.)

INDIANA.—*Duty to Passenger a Continuing One Until He Reaches Destination.*

Where a passenger on an interurban car informed the conductor that he wished to be put off at stop 32, but the conductor negligently carried him by such stop to stop 34, the railroad's duty of using a reasonable degree of care for his safety as a passenger by furnishing transportation or by instructing as to the way and dangers, continued until he walked back to stop 32, since the relation of carrier and passenger, once established, continues until terminated by the passenger, or by the act of the carrier under circumstances justifying its termination, while the act of the railroad in putting decedent off at the wrong place did not so justify termination. (Terre Haute, Indianapolis & Eastern Traction Co. v. Hunter, 111 Northeastern Rep., 344.)

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Central Jersey Traction Company, Keyport, N. J.**—Incorporated to operate an electric railway. Capital stock, $900,000. Incorporators: Francis A. Carter, James F. Shrader and Logan B. Gill, all of Philadelphia.

***Harney Valley Railroad, Portland, Ore.**—Incorporated under the laws of Washington, to construct either a steam or electric railway from Bend, Ore., to Klamath Falls and San Francisco, via Burns. Capital stock, $25,000. H. H. Parker and Isaac D. Hunt, vice-president, Ladd & Tilton Bank, Portland, Ore., are interested.

Portland, Vancouver & Northern Railway, Vancouver, Wash.—Supplemental articles of incorporation were recently filed with the Secretary of State by Henry Crass and C. W. Ford to change the name of the Portland, Vancouver & Northern Railway to the Pacific Coast Railway. The corporation was formed about two years ago and at that time it was understood the intentions were to build a line into Portland, crossing the Interstate bridge over the Columbia River, between Vancouver, Wash., and Portland, Ore.; also to construct interurban lines in Clarke County, Washington. About that time the jitneys became an uncontrollable factor in the transportation business and the financial conditions became stringent. Now that money is seeking investment the promoters are putting the corporation in shape, looking toward early activities. The company holds a franchise to cross the military reservation at Vancouver. Headquarters will be established in Portland. Henry Crass will be chief counsel and C. W. Ford will look after active construction and operation. [Dec. 16, '16.]

FRANCHISES

St. Augustine, Fla.—The Jacksonville & St. Augustine Public Service Corporation has received a year's extension of time on its franchise to construct a line from Jacksonville to St. Augustine. The contract for constructing the line has been awarded to Stephenson Sons Company, Inc., New Haven, Conn. Grading has been completed on 7½ miles of line and 3½ miles of track have been laid. T. R. Osmond, St. Augustine, general manager. [Sept. 9, '16.]

Evanston, Ill.—The Evanston West Side Railway has asked the Public Utilities Commission of Illinois for a certificate of convenience and necessity to construct 7 miles of electric railway on Asbury Avenue, Wesley Avenue, Howard, Main and Davis Streets, Evanston. It is stated that the Evanston West Side Railway is controlled by the officials of the Evanston Railway Company. [Dec. 4, '15.]

Fairfield, Iowa.—The Iowa Railway & Light Company has received a franchise from the City Council to supply electricity in Fairfield.

Portland, Ore.—The Portland Railway, Light & Power Company has received from the City Council a six months' extension of time on its franchise to construct an extension on Morrison Street from Chapman to Washington Street.

Juniata, Pa.—The Altoona & Logan Valley Electric Railway has asked the Borough Council of Juniata for a franchise to construct an extension on Fourth Avenue.

TRACK AND ROADWAY

Edmonton (Alta.) Power Company, Ltd.—It is reported that the Edmonton Power Company is making surveys for the construction of an 80 mile railway from Edmonton to its new power plant site. Work on the construction of the power plant will be begun as soon as the railway is completed, which, it is estimated, will take about a year. E. W. Bowness, engineer. [May 27, '16.]

Glendale & Montrose Railway, Glendale, Cal.—It is reported that work will be begun about March 1 by this company on the construction of an extension from Los Angeles Avenue, Glendale, to Tujunga.

Municipal Railways of San Francisco, San Francisco, Cal.—The contract for furnishing electric conduit and splicing materials for the Municipal Railway in Twin Peaks Tunnel has been awarded to the Standard Underground Cable Company, Pittsburgh, Pa., at $32,128.

Connecticut Company, New Haven, Conn.—It has been officially announced that the Connecticut Company has decided to discontinue interurban service between Church Corner, East Hartford, and Rockville, and double its trolley service over street lines from Hartford to Rockville, owing to the hazard of a combined electric and steam service over the main line tracks of the New York, New Haven & Hartford Railroad between Burnside and Vernon. In place of the discontinued service, the company will maintain a half-hourly trolley service, instead of an hourly service, between Tolland Avenue, Rockville, and the old City Hall, Hartford.

Hartford & Springfield Street Railway, Warehouse Point, Conn.—This company will construct an extension of its tracks in Enfield.

Pocatello Traction & Interurban Company, Pocatello, Idaho.—It is reported that the Pocatello Traction & Interurban Traction Company has increased its capitalization to $2,000,000, and contemplates the expenditure of $1,500,000 on projected lines. C. G. Haynes, Blackfoot, is interested. [Nov. 18, '16.]

Decatur Railway & Light Company, Decatur, Ill.—It is reported that the Decatur Railway & Light Company plans to construct an extension of its Riverside line from the corner of East Wood and South Webster Streets east on Wood Street to Nelson Park, 1¼ miles.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—Establishment of cross-town car service in the southern and western parts of the city, extension of two car lines and several minor changes have been ordered by the Board of Public Works on recommendation of City Engineer B. J. T. Jeup. The recommended route for the cross-town line is along Virginia Avenue from Fountain Square to South Street, along South Street to Kentucky Avenue and along Kentucky Avenue to Stock Street. New track will be needed between Virginia Avenue and Pennsylvania Street. The city will pay $3,500 of the $21,000 cost of the tracks and the county will pay $1,500. Other changes in car service ordered by the Board is the reconstruction of a loop at Riverside Park, construction of double tracks in West Michigan Street from Holmes Avenue to Tibbs Avenue; removal of tracks on Forty-eighth Street and Pennsylvania Street east; extension of the Meridian Heights car line from Forty-eighth to Fiftieth Streets; extension of the Illinois Street line from Thirty-ninth to Forty-sixth Streets with double tracks, and the construction of turnouts on the Brookside Avenue line, from Eighteenth to Olney Streets.

***New Orleans, La.**—It is reported that the construction of an electric railway from New Orleans to Milneburg is being contemplated. The Elysian Field Avenue Commission, W. W. Fisk, secretary, is reported interested.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has asked the Waterways Commission for authority to construct the Pleasant Street bridge over the Taunton River between Dighton and Somerset at Broad Cove. The company desires to construct a trestle sufficiently wide for two street railway tracks.

Detroit (Mich.) United Railway.—A new street car line along the Ford Highway, in a district north of Detroit which is rapidly developing, will be built by the Detroit United Railway. The company has purchased trackage owned by the Michigan Railway in the city of Flint and will extend city service over the line, this district formerly being served only by interurban cars.

Rahway Valley Company, Summit, N. J.—Electrification of the Rahway Valley Company, Summit to Boyden Avenue, Hilton, has been practically completed and consents of property owners in Boyden Avenue are being solicited for the building and operation of a trolley line through that thoroughfare by the company. Negotiations have been begun with Public Service Railway to connect the line, when completed through Boyden Avenue, with its tracks at Springfield Avenue, Hilton. If a traffic handling agreement can be reached with Public Service Railway cars of the Rahway Valley Company will operate from Summit into the Public Service Terminal in Park Place, Newark, and the route of the Morris County Traction Company will be paralleled.

Brooklyn (N. Y.) Rapid Transit Company.—Only one proffer was made when the Public Service Commission for the First District of New York last week opened bids for the relocation of the surface railroad tracks in New Utrecht Avenue, Brooklyn, between Thirty-ninth and Eighty-first Streets. That offer was made by Charles Meads & Company, New York City, and the amount of the bid was $230,000. The surface tracks in question were formerly utilized for the operation of the trains of the West End line on the surface of New Utrecht Avenue. An elevated railroad structure has been constructed under the dual system contracts, upon which the elevated trains now operate, making unnecessary longer the utilization of the surface tracks for train operation. All rights of the Nassau Electric Railroad Company are preserved except that it agrees not to operate either steam or electric trains upon the surface and to use the tracks only for trolley operation.

***New York, N. Y.**—The Bronx Board of Improvement has been incorporated with a capital stock of $600 for the purpose of having surveys made for the construction of a double-track electric railway. The route selected will tap a territory in the extreme northern section of the city, and will follow a general easterly-northeasterly direction, beginning at the Spuyten Duyvil station of the New York Central Railroad on the Hudson River, extending along the Harlem River ship canal to Tibbet Creek, to West 238th Street, to Bailey Avenue, to Gun Hill Road to Pelham Parkway, to City Island, approximately 9 miles. It is estimated the project will cost about $1,000,000. The Bronx Board of Improvement will petition the Public Service Commission to establish the road, requesting them to direct an existing railroad to build the line. In the event that it cannot be accomplished in this way a separate company is to be organized to build it independently. Florence J. Sullivan, 27 Cedar Street; Edward S. Schwartz, and H. E. Becker are the directors of the Bronx Board of Improvement.

Scioto Valley Traction Company, Columbus, Ohio.—Plans are being made by the Scioto Valley Traction Company to improve its lines from Lockbourne to Main Street, Columbus, about 11 miles.

East Liverpool Traction & Light Company, East Liverpool, Ohio.—A 1½-mile extension of its Pleasant Heights line is being considered by the East Liverpool Traction & Light Company. The old rails and ties now used on the present line north of the West End fire station will be replaced by new T-rail. This improvement will involve an expenditure of several thousand dollars.

Youngstown & Southern Railway, Youngstown, Ohio.—Work will be begun in the spring by the Youngstown & Southern Railway on the construction of an extension to East Palestine.

Mahoning Valley Railway, Youngstown, Ohio.—This company has received permission from the Youngstown & Southern Railway to use its tracks from East Woodland and South Avenue, over the South Avenue bridge and on Front Street to Champion Street, thereby enabling the Mahoning Valley Railway to route its Poland Avenue cars into the city in this way.

Kansas-Oklahoma Electric Company, Caney, Okla.—A contract has been awarded by this company to Stephenson Sons & Company, Inc., New Haven, Conn., which has sublet to the Railroad Construction Company, New York, N. Y., for the construction of a line from Wichita, Kan., to Fort Smith, Ark., 165 miles. S. M. Porter, Caney, president. [Jan. 15, '16.]

Tulsa (Okla.) Traction Company.—Announcement has been made by the Tulsa Traction Company that extensions will be built from Tulsa in several directions. The line to Bixby will be extended to Muskogee, to Okmulgee, thence to Nowata via Collinsville and Oolagah. A line will also be built from Tulsa to Sapulpa. A plan is being developed for building a system of lines connecting the various oil field towns, forming a belt line having terminals in the city of Tulsa.

Northampton Traction Company, Easton, Pa.—This company plans to construct an extension to College Hill.

Lehigh Valley Railroad, Philadelphia, Pa.—Electrification of portions of the Lehigh Valley Railroad is in contemplation as referred to in the current issue of the ELECTRIC RAILWAY JOURNAL, page 314.

Pennsylvania Railroad, Philadelphia, Pa.—It has been announced that the branch line of the Pennsylvania Railroad from Seward to Gallitzin will be electrified, the same system as on the Paoli line to be used.

Carolina Rapid Transit Company, Clinton, S. C.—A report on the construction of this company's proposed line from Spartanburg to Clinton was recently submitted by Reid Tull, chief engineer. The proposed roadbed is to be of standard cross-section. All bridges and culverts are to be of concrete, cast iron and steel. Except in a few instances it is proposed to use wooden frame trestles which are to be filled in when the road has been in operation for several years. The main line track is to consist of 80-lb. open-hearth standard section steel rails laid on first class crossties and each rail joint bonded with copper bonds equal in cross-sectional area to the trolley wire. Side tracks are to be laid with smaller sections of second-hand steel rail on second-class crossties. The overhead construction is to be of catenary type using 7-16 messenger wire and No. 0000 copper trolley and feeder wire, placing poles 150 ft. on tangents and 105 ft. on curves, using wooden cross-irons for feeders, and message wires and steel arms for messenger and trolley wire support. It is proposed to build three carhouses, one at Spartanburg, one at Union and at either Laurens or Clinton, also two substations, one located at or near Glenn Springs and one at Cross Anchor. The equipment is estimated on using three 60-ton electric locomotives for freight service and six three-compartment interurban passenger cars equipped with motors for passenger service; also two cabooses, six flat cars and six lever cars for use in freight and maintenance service. [Nov. 25, '16.]

Corpus Christi (Tex.) Traction Company.—This company, which plans to construct a line from Corpus Christi to Ward Island, has abandoned its plan to build a loop line on Water, South Second and other streets in Corpus Christi and will build only to its terminal station. The franchise will be amended accordingly. J. H. Caswell, Corpus Christi, general manager. [June 17. '16.]

Dallas (Tex.) Northwestern Traction Company.—E. P. Turner, Dallas, president of the Dallas Northwestern Traction Company, which proposes to build an interurban line from Dallas northwestward to Slidell, approximately 58 miles, announces that he has closed an underwriting contract for bonds sufficient to build and equip the line. The first order for equipment will call for not less than sixteen standard-size passenger cars. Much of the right-of-way has already been secured, and it is announced that the construction company will be ready to begin work as soon as the rest of the right-of-way is available. [Jan. 13, '17.]

***Port Orchard, Wash.**—T. B. Kidd, representing Tacoma, Wash., capitalists, is promoting the construction of an electric interurban, from Port Orchard through the Burley Valley to Gig Harbor, connecting with Tacoma by a large ferry to Point Defiance. Mr. Kidd has asked the commercial bodies of the towns in the vicinity of Port Orchard to take up the matter, and the county commissioners of Pierce County, Tacoma, have requested that a committee from the commercial clubs meet with them, to take up the matter of a ferry to be jointly owned and maintained by Pierce and Kitsap counties. The proposition is also made to turn the line over to the counties at its actual cost of construction, if the counties desire to assume control.

Tacoma Railway & Power Company, Tacoma, Wash.—The city of Tacoma and the Todd Shipbuilding & Repair Company of that city have started negotiations looking toward the extension of the Tideflats carline from its present terminus to the location on the tideflats, where the Todd Shipbuilding & Repair Company is erecting new shipyards. If the extension is made, it will be operated on virtually the same joint contract that the present tideflats line is being operated or the Tacoma Railway & Power Company will make a proposition to the city of Tacoma for the purchase of the present municipal line over the tideflats and construct and operate the extension as a part of its present system. The present municipal line is operated under an agreement with the city by the Tacoma Railway & Power Company.

SHOPS AND BUILDINGS

Detroit (Mich.) United Railway.—This company has recently purchased a block of property at Fort and Fifteenth Streets as a site for a new west side freight depot. The company's present freight house property at Sixth and Congress Streets will be turned over to the Pennsylvania Railroad.

Valley Railways, Lemoyne, Pa.—Tentative plans have been made by the Valley Railways for the construction of a terminal station along River Street, Harrisburg, extending from Walnut Street to Strawberry Street, and the double-tracking of Walnut Street between Front and River Streets to relieve the traffic congestion in Market Square.

POWER HOUSES AND SUBSTATIONS

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—The City Council of Mason is considering a proposal submitted by the Commonwealth Power, Railway & Light Company to take over the municipal distribution system and lighting business for $15,000. An election will soon be called to submit to the voters the proposal as to whether the proposition of the company shall be accepted or a new plant installed.

Columbus Railway, Light & Power Company, Columbus, Miss.—A new 1000-hp. steam turbine is being installed by the Columbus Railway, Light & Power Company, doubling the capacity of its plant.

Lincoln (Neb.) Traction Company.—This company has leased its power plant to the Commonwealth Power Company of Lincoln and has entered into a contract with the power company to purchase energy to operate its system for a period of forty-nine years. The Commonwealth Power Company contemplates the construction of dams and power stations on the Blue River to furnish power for the local traction system and the interurban line to the city of Omaha.

Interborough Rapid Transit Company, New York, N. Y.—This company has recently purchased the property at 77 and 79 Murray Street, and will construct a two-story and basement building for joint use by the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company as a substation for the operation of the new subway lines and the present elevated roads.

Cleveland (Ohio) Railway.—The Council of the City of Cleveland has adopted a resolution authorizing the Cleveland Railway to expend $300,000 for a new substation.

Youngstown & Sharon Street Railway, Youngstown, Ohio.—This company will construct an electric plant in Youngstown.

Portland Railway, Light & Power Company, Portland, Ore.—Preparations are being made by the Portland Railway, Light & Power Company to furnish additional electric power to the Southern Pacific Company for the operation of its trains over the electrified railway from Whiteson to Corvallis. The transmission line from the power station on the Clackamas River to Salem is under construction from Mount Angel southwesterly, so it may carry higher voltage current and larger facilities for distribution of power from Salem are being provided. The total expenditure will be between $50,000 and $60,000.

Rhode Island Company, Providence, R. I.—A new substation will soon be built at Harmony by the Rhode Island Company.

Manufactures and Markets

Discussions of Industrial Conditions
A Department for the Manufacturer, Salesman and Purchasing Agent
Rolling Stock Purchases Business Announcements Trade Literature

$2,000,000 for Cars in Boston

President Brush Outlines Plans of Company for Immediate Improvements if Legislature Permits—He Also Reviews Expenditures of Past Six Years

Extensive plans for new equipment were announced in Boston this week by President Matthew C. Brush of the Boston Elevated Railway. They are contingent upon the passage by the Legislature of a bill authorizing the company to issue temporary bonds or use the proceeds of the sale of the Cambridge subway temporarily to purchase more cars and equipment. The passage of such a bill was recommended by the commission appointed to investigate the financial condition of the company. The amount which it is proposed thus to expend for new cars is more than $2,000,000. In discussing these plans President Brush reviewed what the company had done in the recent past in the way of new equipment. He said in part:

"On Aug. 31, 1916, the company placed orders for 100 center-entrance high-speed multiple-unit control stepless semi-convertible cars for use in the East Boston tunnel, these cars being contracted for at the price of approximately $8,750 each, or a total cost of $875,000 for delivery beginning in May, 1917, at the rate of five cars per week. On Aug. 25, 1916, the company placed an order for forty-two rapid-transit cars, similar in design to those operated on the elevated lines and in the Washington Street tunnel, except that the doors are slightly enlarged, at the price of approximately $12,000 each or a total cost of $504,000. Delivery on these cars will begin in April, 1917, at the rate of two to four cars per week. On Jan. 13, 1917, the company placed an order for thirty-five cars for use in the Dorchester tunnel, substantially identical to those now in use in the Cambridge subway, at the price of approximately $18,500 each, or a total cost of $647,500, for delivery beginning in November, 1917, at the rate of six cars per week. In other words, during the past six months the company has placed orders for $2,026,500 worth of equipment to the extent of 177 cars, these cars being all of the latest design, all steel and embodying all the latest developments of the art in all appurtenances and auxiliary equipment. The contracts for these cars have in each case been let with the lowest bidder at a cost of about 70 per cent above the cost of two years ago, and deliveries are to be made at the earliest possible date.

"Previous to the placing of the order for the first of these cars on Aug. 25, 1916, the company had during the past six years purchased 135 rapid transit cars and 450 surface cars on the following dates at the respective prices specified:

Elevated Cars:	
20 in 1911 at $ 9,962.71 each	$199,254.13
55 in 1913 at 10,961.25 each	602,868.73
Cambridge Subway Cars:	
40 in 1911 at $12,237.97 each	489,519.00
20 in 1912 at 11,418.85 each	228,377.13
Surface—Semi-Convertible Cars:	
50 in 1910 at $7,548.90 each	377,445.19
50 in 1911 at 7,607.38 each	380,369.34
75 in 1912 at 6,535.66 each	490,174.96
100 in 1913 at 6,897.34 each	698,733.50
Surface—Trailer Cars:	
125 in 1915 at $3,217.61 each	402,200.94
50 in 1916 at 3,521.41 each	176,070.73
	$4,045,013.65

"In addition to the above investment, the company has spent, in order to widen tracks sufficiently to operate new cars, during the same period, $226,734; has spent for bridge strengthening, carhouse changes and loops for these new cars, $354,316, and in order to furnish power for the operation of equipment, the company has spent for generation, substations and distribution lines, $6,360,400, during the same period. Further, the company has invested, since the spring of 1912 in the Cambridge Subway, East Cambridge viaduct and various station and carhouse enlargements, a total of $14,619,000, and during the same period has incurred obligations to pay rental on Beacon Hill tunnel, Boylston Street Subway, East Boston Tunnel extension, a total investment of $8,572,000, as well as to pay interest on a further investment in the Dorchester Tunnel and its equipment, the Everett extension, the Bennington Street double track and the improvement of Lake Street, of $13,192,186.

"In other words, since 1911, the company has either as a result of legislative acts or with the approval of the Public Service Commission incurred a liability to pay either rental or interest on an investment for improved service of $49,396,149. Of this sum, $34,177,463 represents property now in operation and $15,218,686 property which will be in operation during the next year. This $49,396,149 is substantially equivalent to the total amount of money invested in what is now the Boston & Albany Railroad Company from the first charter in 1831 up to date."

Poles Purchased in 1915

More Than Half of the 4,000,000 Poles Purchased in This Year Were of Cedar

Statistics have been compiled by the Government Forest Service on the poles purchased during 1915 in the United States by telephone and telegraph companies, steam and electric railroads, and electric light, heat and power companies. Information was requested from approximately 17,000 purchasers, representing practically all the pole users in this country. The data in the following tables represent between 90 and 95 per cent of all the poles purchased. A few sawed poles of redwood and western pine are not included.

The annual demand for poles, which now exceeds 4,000,000, the report states, is supplied principally from three different regions of the United States. The northern white-cedar region of the Lake states, the chestnut region of the Eastern portion of the country, and the Western red-cedar region of the Northwest, which includes Idaho, Oregon and Washington.

Most of the cedar poles purchased were the Northern white variety, which were purchased largely by telephone and telegraph companies and steam railroads. Electric railways, light and power companies, however, it was noted, purchased more of Western red cedar than any other type of pole. These companies also had a large demand for pine poles.

In Table I, data for the years from 1908 to 1911, compiled in co-operation with the Bureau of the Census, are also given. Cedar, chestnut and pine constitute 91 per cent of all poles reported purchased in 1915, and of this amount 61 per cent were cedar. Most of the pine was that commonly known as southern yellow pine, which includes longleaf, shortleaf and loblolly. Western yellow pine was also reported in small quantities. The use of cypress as a pole timber seems to be falling off each year. The minor

TABLE I—POLES PURCHASED IN 1915, AND FROM 1908 TO 1911, CLASSIFIED BY KIND OF WOOD

Kind of Wood	1915	1911	1910	1909	1908
All kinds	4,077,964	3,418,020	3,870,694	3,738,740	3,249,154
Cedar	2,521,769	2,100,144	2,431,567	2,439,825	2,200,139
Chestnut	651,643	693,489	677,517	608,066	516,049
Pine	546,233	161,690	184,677	179,586	116,749
Oak	199,442	199,590	265,290	236,842	160,702
Cypress	67,644	72,995	75,459	77,677	90,579
All other	91,233	190,112	236,184	196,744	164,936

species, classified in the tables as "all other kinds," were redwood, spruce, tamarack and osage orange.

As indicated in Table II, the principal purchasers of poles were telephone and telegraph companies. They reported, however, a decrease of 30 per cent, as compared with the number purchased in 1911. The number reported by electric railways and power companies represents an increase of 44 per cent, and that for steam railroads a 76-per cent increase.

TABLE II—POLES PURCHASED IN 1915, CLASSIFIED BY KIND OF WOOD AND CLASS OF PURCHASER

Kind of Wood	Total	Telephone and Telegraph Companies	Electric Railways, Light and Power Companies	Steam Railroads
All kinds	4,077,964	1,680,880	1,430,122	966,962
Northern white cedar	1,747,210	1,029,219	239,864	478,127
Chestnut	651,643	336,496	275,301	39,843
Western red cedar	567,770	105,590	422,312	39,868
Pine	546,233	69,787	388,210	88,236
White oak	177,799	34,644	13,110	130,045
Red cedar	117,545	21,386	8,424	87,735
Southern white cedar	89,244	16,661	14,686	57,897
Cypress	67,644	24,162	18,174	25,308
Red oak	21,643	6,912	13,001	1,730
All other	91,233	36,023	37,037	18,173

Table III classifies the poles according to length, and shows that all of the leading woods contributed poles to each group. About 67 per cent were less than 30 ft. long, and were used chiefly by telephone and telegraph companies. Those less than 20 ft. long were reported largely by rural telephone companies. The figures for this group show an increase as compared with reports for 1911, while the number of poles between 20 ft. and 30 ft. in length was less.

TABLE III—POLES PURCHASED IN 1915, CLASSIFIED BY LENGTH AND KIND OF WOOD

Kind of Wood	Total	Less Than 20 Ft.	20 to 29 Ft.	30 to 39 Ft.	40 to 49 Ft.	50 Ft. or More
All kinds	4,077,964	1,236,694	1,531,441	980,091	256,236	73,502
Northern white cedar	1,747,210	540,565	755,311	373,874	67,358	10,102
Chestnut	651,643	23,992	255,951	295,717	63,676	12,307
Western red cedar	567,770	17,874	314,010	139,041	71,608	25,237
Pine	546,233	373,688	69,931	65,004	23,914	13,696
White oak	177,799	120,393	33,550	16,120	5,998	1,738
Red cedar	117,545	94,997	14,870	5,624	1,541	513
Southern white cedar	89,244	4,414	13,282	49,264	15,734	6,550
Cypress	67,644	13,048	22,211	26,316	4,542	1,527
Red oak	21,643	3,737	16,341	1,280	139	146
All other	91,233	43,986	35,984	7,851	1,726	1,686

More Cables Going Underground

Municipal and Economical Requirements Accelerate Use of Conduit—Safe Voltage Limits Are Increasing

The cable market conditions have temporarily held back much underground work but the trend of the times is toward a rapidly increasing use of underground, rather than aerial, wires and cables. This statement no doubt will apply more exactly to the power and lighting field than to the electric railway field, but the municipal requirements of the larger cities, the demand for continuity of electric railway feeding service and the economic necessity for permanent construction, are accelerating the use of underground conduits for railway feeders. The impelling factors, according to a recent statement of the National Fireproofing Company, Pittsburgh, are lower maintenance costs and reductions in the number of interruptions. On the latter point, at a meeting of the American Institute of Electrical Engineers, the late H. G. Stott of New York is quoted as having called attention to the efficiency of underground service with the following statement: "The number of burn-outs per 100 miles of underground cable per annum has fallen during the last two years to 0.28, or practically one per 400 miles of cable per year. That is a reassuring record; when an overhead transmission line can show anything like it, we can look forward to reliable long-distance transmission."

The statement is also made by the National Fireproofing Company that the limits of installation and size have kept the transmission voltage for underground cables to about one-third that for overhead transmission. Numerous installations are in operation where the pressures are 20,000 volts and even 25,000 volts; while from present indications underground systems operating at potentials of 50,000 volts and over will not be uncommon in a few years.

The McRoy-Camp conduits as manufactured by the earlier mentioned company, have been standardized and, therefore, can be sold on a more uniform basis than in earlier years when there was a greater diversity in the character of products intended for the same service.

Industrial Mobilization Continues

The mobilization of industrial resources, as a consequence of the international situation created by Germany in the renewed threat of ruthless submarine warfare has continued in Washington during the past week.

The Council of National Defense has held various meetings in Washington with its advisory commission.

Representatives of trades, business and professions are being asked to deal with this Council directly for the discussion of problems in industrial mobilization which may affect the national welfare. The time is rapidly coming, a Washington correspondent of the *Electrical World* reports, when there will be very little, if any, publicity given to these measures of industrial mobilization for national defense. In other words, a censorship is liable to go into effect any day. Already certain steps have been taken by the government in regard to censorship and the plans for an extension of this precaution are upon a scale which will preclude the possibility of business men obtaining news of their industries from the daily newspapers. Even now, the news sent from Berlin by wireless is being censored by the State Department before publication in this country, and the proposed act of Congress providing for a general censorship is ready for rapid passage by Congress. In these circumstances, the best Washington opinion is that leaders in industry will do well to place themselves in personal communication with the government, without waiting "for any eventuality."

CURRENT PRICES FOR MATERIALS

Quoted Thursday, Feb. 15.

Copper (electrolytic)	New York, 34½ cents per pound
Rubber-covered wire (base)	New York, 39 cents per pound
No. 0000 feeder cable (bare)	New York, 37½ cents per pound
No. 0000 feeder cable (stranded)	New York, 35 cents per pound
No. 6 copper wire (insulated)	New York, 35 cents per pound
No. 6 copper wire (bare)	New York, 37 cents per pound
Tin (straits)	New York 53 cents per pound
Lead	New York 9 cents per pound
Spelter	New York, 10¾ cents per pound
Rails, A. S. C. E., O. H.	Mill, $40 per gross ton
Rails, A. S. C. E., Bess	Mill, $38 per gross ton
Wire nails	Pittsburgh, $3 per 100 pounds
Steel (bars)	Pittsburgh, 3.25 cents per pound
Sheet iron (black, 28 gage)	Pittsburgh, 4.75 cents per pound
Sheet iron (galv., 28 gage)	Pittsburgh, 6.50 cents per pound
I-beams over 15 in.	Pittsburgh, 10 cents per pound
½-in. galv. extra high strength steel wire,	New York, $6.82 per 100 ft.
⅜-in. galv. high strength steel wire	New York, $3.41 per 100 ft.
⅜-in. galv. Siemens-Martin wire	New York, $2.52 per 100 ft.
5/16-in. galv. Siemens-Martin wire	New York, $1.94 per 100 ft.
Galvanized barb wire and staples	Pittsburgh, 3.85 cents per pound
Galvanized wire (ordinary)	Pittsburgh, 3.65 cents per pound
Cement (carload lots) with rebate for sacks.	New York, $2.07 per barrel
Cement (carload lots)	Chicago, $1.96 per barrel
Cement (carload lots)	Seattle, $2.60 per barrel
Sand in large lots	New York, 50 cents per ton
Linseed oil (raw, 5-bbl. lots)	New York, 94 cents per gallon
Linseed oil (boiled, 5-bbl. lots)	New York, 95 cents per gallon
White lead (100-lb. keg)	New York, 9¾ cents per pound
Turpentine (bbl. lots)	New York, 52 cents per gallon

OLD METAL PRICES

Copper (heavy)	New York, 29 cents per pound
Copper (light)	New York, 25 cents per pound
Red brass	New York, 21 cents per pound
Yellow brass	New York, 19 cents per pound
Lead	New York, 8 cents per pound
Steel car axles	Chicago, $34 per net ton
Zinc	8.5 cents per pound
Iron car wheels	Chicago, $18 per gross ton
Steel rail (scrap)	Chicago, $24.50 per gross ton
Steel rail (relaying)	Chicago, $30 per gross ton
Machine shop turnings	Chicago, $9.25 per net ton

ROLLING STOCK

Lorain (Ohio) Street Railway has placed an order with the Jewett Car Company for twelve 52-ft all-steel interurban car bodies and for five steel car bodies for city service.

Southern Illinois & St. Louis Railway, Marion, Ill., has ordered four 50-ft. steel express cars, three 50-ft. steel passenger cars and eleven 60-ft. interurban cars from the American Car Company, St. Louis, Mo.

Ocean City & Fenwick Island Railway, Ocean City, Md., is in the market for about ten miles of 60-lb. relaying rail, also for necessary overhead material and four open-type trolley cars.

Wheeling (W. Va.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 3 as being in the market for cars, has placed an order with the Jewett Car Company for fourteen prepayment car bodies.

Tri-City Railway, Davenport, Iowa, will remodel twelve old cars for service as pay-as-you-enter cars. The work will be started as soon as the new car house and shops have been completed at Thirty-fifth Street and Fifth Avenue, Rock Island, Ill.

Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, has specified the following details on the ten closed motor cars recently ordered from the American Car Company:

Seating capacity	40
Bolster centers, length,	15 ft. 10 in.
Length of body	25 ft. 6 in.
Over vestibule	37 ft. 6 in.
Width over sills	8 ft. 0 in.
Width over all	8 ft. 3 in.
Height, rail to sills	26¼ in.
Sill to trolley base	8 ft. 6 in.
Body wood or metal,	Metal and wood
Interior trim	Bronze
Headlining	Agasote
Roof, type	Monitor deck
Underframe	Metal
Air brakes	General Electric
Axles	Brill
Bumpers,	American Car Company
Cables	General Electric
Car trimmings	Brill
Control type	K-12
Couplers	Brill Radial
Curtain fixtures	Curtain Supply
Window fixtures	Brill
Curtain material	Pantasote
Door operating mechanism,	American Car Company
Destination signs	Keystone
Gears and pinions,	General Electric
Gongs	American Car Company
Hand brakes	Pittsburgh Drop Handle with Peacock Drum
Headlights	Golden Glow
Journal boxes	Brill
Motors, type and number,	Four, G. E., 256-A
Motors	Inside hung
Paint	C. V. Process
Registers	International
Sanders	Ohio Brass
Sash fixtures	Brill
Seats, style,	Hale & Kilburn, 199A
Seating material	Rattan
Springs	Brill
Step treads	Feralin anti-slip
Track scraper	Brill
Trolley catchers	Ohio Brass
Trolley base	General Electric
Trucks, type	Brill 77-E-1
Wheels	American Car & Foundry
Special devices,	Brill renitent post casings

TRADE NOTES

W. B. Cosgrove, 50 Church Street, New York, N. Y., has been appointed special representative of the Chicago Mica Company.

Ohio Brass Company, Mansfield, Ohio, has received an order from the Connecticut Company for 146 air sander equipments.

S. K. F. Company, Ltd., 47 King Street, West Toronto, Ontario, Canada, has been recently organized to handle the S. K. F. products in Canada.

Templeton, Kenly & Company, Ltd., Chicago, Ill., held the annual meeting of stockholders on Feb. 3. H. W. Finnell, vice-president of the company, was elected a director.

William H. Bennett, who for nearly a year has been advertising manager of the Searchlight Company, Chicago, has joined the forces of the Service Motor Supply Company, Fifteenth Street and Michigan Avenue, Chicago, Ill.

Bound Brook (N. J.) Oil-less Bearing Company announces the election of its second vice-president, Spencer Weart, as president and the election of its general manager, George Oakley Smalley, as treasurer.

Commercial Electric Supply Company, 42 Congress Street, East Detroit, Mich., has appointed Frederick Riebel, Jr., formerly district sales manager of the George Cutter Company, as general manager.

United States Ball Bearing Company, Chicago, Ill., announces that Otto Bruenauer has become associated with them, in the enlargement and broadening of their field of activities, as engineering manager.

Perry Ventilator Corporation, New Bedford, Mass., has received an order to equip with ventilators the twelve cars for the Worcester Consolidated Street Railway being built by the Osgood Bradley Car Company.

Standard Forgings Company, Chicago, Ill., announces that at the annual meeting of the company, 411 Railway Exchange Building, E. W. Richey was elected vice-president and J. G. Coles was elected treasurer. George E. Van Hagen is president of the company.

Quasi-Arc Weldtrode Company, West Nyack, N. Y., has been incorporated by W. Moffatt, D. C. Alexander and F. W. Gordon, 61 Broadway, New York, N. Y. The company is capitalized at $150,000 and proposes to manufacture electrodes, weldtrodes, machinery, accessories, etc.

Moody Engineering Company, New York, N. Y., has been incorporated by R. H. Jones, F. R. and R. D. Moody, 115 Broadway, New York, N. Y. The company is capitalized at $250,000 and proposes to do a general consulting, operating, electrical, mechanical and civil engineering business.

Richardson-Phenix Company, Milwaukee, Wis., announces the opening of a sales office in Cleveland, located in the Builders' Exchange, in charge of W. J. Oettinger, in order to take care of the increased business in Ohio. Mr. Oettinger was formerly connected with the engineering department at the home office.

Union Switch & Signal Company, Swissvale, Pa., on Feb. 10 had a portion of its plant, including the machine shop and the packing department, destroyed by fire. However, the foundry, forge shop, pattern and carpenter shops and the general offices, which house the drawings, were left entirely untouched.

Pratt & Lambert, Buffalo, N. Y., varnish makers, have elected the following officers and directors for the coming year: W. H. Andrews, chairman of the board; J. H. McNulty, president; J. N. Welter, vice-president; J. B. Bouck, Jr., secretary and treasurer; A. C. Bedford, C. M. Pratt, F. W. F. Clark, R. F. Clark, S. N. Griffiths and J. P. Gowing, directors.

H. W. Watts, who has been in the New York office of the Diehl Manufacturing Company for several years has been promoted to manager of the Boston office. Mr. Watts succeeds H. A. Howard, who has resigned to devote his entire time to the companies in which he is personally interested. L. F. Tankard has been promoted to manager of the New York office of the company.

Kennedy, Mitchell & Company, Inc., New York, N. Y., fiscal agents for Southern Illinois & St. Louis Railway, have combined the railway company's office which was previously at 15 Wall Street with that of the Kennedy, Mitchell & Company's office at 42 Broadway. The operating offices of the railway are located at Marion, Ill. W. H. Schott is president and treasurer of the company.

Strauss Transit System, Inc., 185 Jefferson Avenue, East, Detroit, Mich., has issued an illustrated booklet describing the Strauss inverted elevated railway system. In this system the cars are suspended from a trussed overhead structure mounted on a single line of posts. The designer of this system is J. B. Strauss, president and engineer of the Strauss Bascule Bridge Company of Chicago.

A. W. Hartigan of the New York sales department of the Western Electric Company has been appointed sales manager of the Electrical Alloy Company with headquarters at 41 Union Square, New York City. The company also announces that it now occupies a new, large, modern, fireproof factory building, just completed, in Morristown, N. J., which will enable it to increase vastly its production.

Electric Crane & Manufacturing Company, Milwaukee, Wis., has been organized by a group of former officials and engineers of the Pawling & Harnischfeger Company, including S. H. Squier, M. A. Beck, Arthur Mayer, Leo Mayer and Arthur A. Fritsch. The company has purchased the plant of the former Fred M. Prescott Steam Pump Company, at Sixty-fourth and National Avenues, West Allis.

Hess-Bright Manufacturing Company, Philadelphia, Pa., announces the opening of two branch sales offices—one at 1974 Broadway, New York, N. Y., and one at 1036 Guardian Building, Cleveland, Ohio. H. E. Brunner is in charge of the New York Office and is assisted by H. A. Fonda. The Cleveland Office is under the direction of R. E. Clingan, assisted by Walter Rippier and M. S. McNay. W. L. Batt, general sales manager, states that these offices are opened with the intention of giving more prompt and thorough attention to the ball bearing trade than has heretofore been possible.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces, in addition to a large number of orders for central station apparatus, an order for eight additional 1500-kw. rotary converters with transformers from the Cleveland Railway Company. This makes a total of twenty 1500-kw. Westinghouse rotary converters which this railway has ordered from the Westinghouse Company.

American Railways Equipment Company, Dayton, Ohio, which has recently begun the manufacture of a coin-ticket registering fare box for prepayment fare collection, has opened offices at 1165 Reibold Building. D. B. Whistler, who has been actively identified with the fare register business in this city for the last fifteen years, is the inventor and president of the new company. E. L. Reed, patent attorney, is associated with Mr. Whistler.

Stephenson Sons & Company, Inc., New Haven, Conn., railway contractors and dealers in railway investments, announces that the company has incorporated for $100,000, all paid in. Edward N. Breitung, international banker, and heavily interested in the iron industry in the upper Peninsula of Michigan, is president; Gen. Charles Neilson, a railroad constructor and financier, with offices at 11 Pine Street, New York, is vice-president; C. C. Carroll is secretary, and William F. Lewis, treasurer.

E. B. Merriam, for several years assistant engineer of the switchboard department of the General Electric Company, has resigned his position to become the head of the industrial service department. Mr. Merriam has been connected with the company for sixteen years and is well known for his work in connection with high-voltage automatic circuit interrupting apparatus. He has contributed a number of technical papers to the A. I. E. E., N. E. L. A., etc., on protective apparatus. He was chairman of the Schenectady section of the Institute in 1913.

Combustion Engineering Corporation, New York, N. Y., has doubled the size of its New York offices to accommodate the increase in business. This company has also added considerably to its staff of engineers and draftsmen. A service department will be established under the direction of John Morris, who has been associated with the company since its organization. Mr. Morris will have under his direction a corps of competent engineers who will co-operate with the trade with the idea of rendering free inspection and engineering service.

Berger Manufacturing Company, Canton, Ohio, announce the following appointments: R. W. Van Horne has been transferred from the New York office and placed in charge of the building material products division at the home office; Norman A. Hill, formerly efficiency engineer for the Du Pont Powder Company, has been appointed efficiency engineer; P. V. Stonerod, formerly inspector for the Carnegie Steel Company, has been placed in charge of the sidewalk light department; and A. H. Bromley, Jr., contracting engineer, who for the last several years has looked after the interests of the Berger Manufacturing Company in the Cleveland territory, has been appointed chief engineer of sales, and hereafter will be located in the Canton office.

Holden & White, Chicago, Ill., general sales agents for the Joliet Railway Supply Company, have recently received a number of orders for Perry anti-friction side bearings and Hartman self-centering center plates. Orders for these bearings have been placed by the following electric railways: Fort Wayne & Northwestern Railway; Beaver Valley Traction Company; Aurora, Elgin & Chicago Railway; Metropolitan West Side Elevated Railway; Washington, Baltimore & Annapolis Electric Railway; Newport News & Hampton Railway, Gas & Electric Company; American Car & Foundry Company for Louisville Railways; Fonda, Johnstown & Gloversville Railroad Company; Northern Texas Traction Company; Houghton County Traction Company; J. G. Brill Company for the Ogden, Logan & Idaho Railway; Schenectady Railway; Union Traction Company of Indiana; Baldwin Locomotive Works; McGuire-Cummings Manufacturing Company for the Chicago & West Towns Railway; New York, Westchester & Boston Railway; Northwestern Elevated Railroad; Calgary Street Railway, and the Des Moines City Railway.

ADVERTISING LITERATURE

Standard Varnish Works, New York, N. Y., has issued a pamphlet on its waterproof cement floor paint.

Cumberland Electric Manufacturing Company, Clarksville, Tenn., has prepared a bulletin descriptive of its low-voltage transformers and electrical specialties.

Laclede-Christy Clay Products Company, St. Louis, Mo., has issued a bulletin of a complete line of fire brick for every furnace requirement.

Ray Manufacturing Company, Louisville, Ky., has issued a bulletin descriptive of its continuous feed-water regulators.

Laconia Car Company, Boston, Mass., has issued a catalog describing all types of steam and electric railway cars for freight and passenger service. Illustrations and details of construction are given for 67 cars built for the different roads. Figures 1 to 50 show cars for steam railroad service, and figures above 50 show cars for electric railway service.

S. K. F. Ball Bearing Company, Hartford, Conn., has issued an attractive catalog on its self-aligning ball-bearing hangers and pillow blocks. The subjects of power saving, the use of small motors, saving in lubrication and in maintenance, reducing fire hazards, etc., are fully covered. A number of pages of data containing tables, curves and engineering data on mounting, lubrication, testing lubricants, dimensions of equipment, etc., are given. Announcement is also made of the S. K. F. engineering service.

Western Electric Company, Inc., New York, N. Y., is distributing its 1917 year book on electrical supplies. This book follows the plan of uniform list prices that was inaugurated in the year book of 1915. This 1310-page volume is well illustrated and has been carefully prepared in such a manner as to make things easy to find for the prospective purchaser. This year book is regularly supplemented by descriptive matter, booklets and other literature on the following: Poles, pole-line hardware, motors and generators, telephone apparatus, lamps, automobile accessories, electrical material for farms and electrical household devices.

NEW PUBLICATIONS

Principles of Alternating-Current Machinery. By Ralph R. Lawrence, Associate Professor of Electrical Engineering of the Massachusetts Institute of Technology. McGray-Hill Book Company, Inc., New York, N. Y. 603 pages. Cloth.

Written especially for technical men and students in electrical engineering, this book deals with the construction of alternating-current machines and the principles of their operation. All those types of machines are dealt with which embody fundamental and important principles in this field. It is not essentially a book on design, although calculations are given to analyze the electrical theory underlying various details of construction and winding.

Underground Transmission and Distribution. By E. B. Meyer. McGraw-Hill Book Company, Inc., New York, N. Y. 308 pages. Cloth, $3, net.

Pole and Tower Lines. By R. D. Coombs, C.E. McGraw-Hill Book Company, Inc., New York, N. Y. 267 pages. Cloth, $2.50, net.

Mr. Meyer in his book deals with the operation of underground systems for distributing electrical energy for lighting and power purposes. He describes, in part, the various methods of distribution, manhole and conduit construction, and the installation and testing of cables. He explains the practical methods of meeting problems involved, but assumes that the reader understands the principles underlying electrical theory. The book by Mr. Coombs is devoted to the subject of overhead construction, the developments necessitated by the use of high transmission voltage being of especial importance. He discusses factors in the design of poles and towers, and gives methods of erection and testing. Those two books afford a general knowledge of present practices in electric power transmission, since each is able to cover its field more fully than could a treatise of wider scope.



T'YEER-NA-N-OGE

T'yeer-Na-N-Oge is Irish for the "Country of the Young."

No sorrow or worry of any kind ever has a look-in at this blessed spot.

In our own little way we're trying to make a **T'yeer-Na-N-Oge** of our own for American railway men.

For nothing is more distressful to them than to feel that they are even indirectly responsible for the death or crippling of innocent people.

So for every life and every limb saved by PEACOCK BRAKES there's a gray hair less in the heads of motorman and manager alike.

PEACOCK BRAKES keep railroaders in the "Country of the Young" sure enough.



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Buffalo, N. Y.

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Arthur D. Little, Inc.
An organization prepared to handle all work which calls for the application of chemistry to electric railway engineering—such as the testing of coal, lubricants, water, wire insulation, trolley wire, cable, timber preservatives, paints, bearing metals, etc.
Correspondence regarding our service is invited.
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H. M. Byllesby & Company, Inc.
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Purchase, Finance, Construct and Operate Electric Light Gas, Street Railway and Water Power Properties.
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HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT AND POWER PROPERTIES
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PHILADELPHIA, PA.
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80th Street and East End Ave., New York, N. Y.

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Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS



Transmission Towers at Birmingham, Alabama. Alabama Power Company.

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Tell what you have to sell. Tell what a bargain it is. Tell the men who want it, the details that will interest them.
The readers of this paper are buying and selling thousands of dollars' worth of second-hand equipment every day.

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239 West 39th Street New York City

ROOSEVELT & THOMPSON
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Report, Investigate, Appraise, Manage Electric Railway, Light and Power Properties.

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IT IS A PAYING INVESTMENT
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SERVICE—

A much abused word that we interpret successfully.

We believe that "90% of all orders shipped same day received" is a good definition.

Try us on that requisition —NOW.

UNION ELECTRIC COMPANY
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COLLIER SERVICE
YOU
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NEW CENTRAL PLANT
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White's Porcelain Trolley Hangers give the service

because of the extreme simplicity of parts.

The yoke is sherardized and lasts indefinitely.

The insulator is of high grade porcelain.

The bolt is—well, just a plain bolt. If it ever breaks put in another—they are cheap.

Send for a sample. A look should convince you. If you are skeptical, test it. The test will prove our claims.



We can make immediate delivery from parts in stock

T. C. WHITE
Electrical Supply Co.
1122 Pine St., St. Louis, Mo.

Foreign Representatives, Forest City Electrical Service Supply Company, Salford, England

Steel for Service

STEEL TIES

This company manufactures steel cross ties and fastenings suitable for every kind of service.

Its heavy sections are used by steam and traction roads under most exacting conditions.

Its lighter sections are especially adapted for use in mine and portable track.

When you are in the market let us figure with you on your requirements.

The mark of quality  It protects the user

Carnegie Steel Company

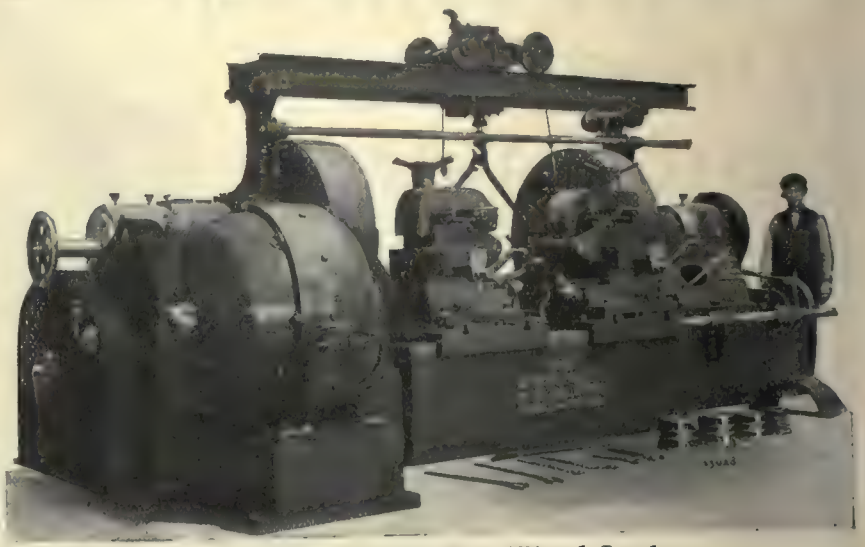
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Machine Tools and Cranes

For Electric Railway Repair Shops

Full line of high grade machines for the special requirements of such shops, as well as all types of standard machine tools, steam hammers and electric traveling cranes.

The Car Wheel Lathe shown is of heavy massive construction and is equipped with all the modern improved devices for the rapid handling and turning of steel car wheels. It is designed for wheels from 26" to 42" diameter, and will take in axles having either outside or inside journals.



Heavy Open-Center Car Wheel Lathe

Right-hand head is traversed by a motor and has a friction safety device to prevent the possibility of accident in case the faceplates are brought up too forcibly against the wheels. A convenient calipering device, "Sure Grip" drivers and patented pneumatic tool clamps are provided.

Niles-Bement-Pond Co., 111 Broadway, New York City

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Tape Security is Possible

Why not guard your equipment against attack? An easy and quick way to fortify is to specify any of our

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Protection where high voltage wires interlace requires extra defensive measures

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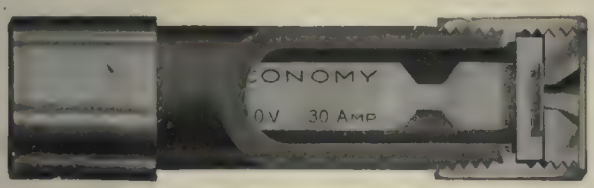
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ECONOMY renewable cartridge FUSES

Protect Cars and Power-plant

Don't trust to your more limited facilities for refilling fuses. As fuse specialists, we furnish reliable and carefully *tested Renewal Links* all ready to insert in

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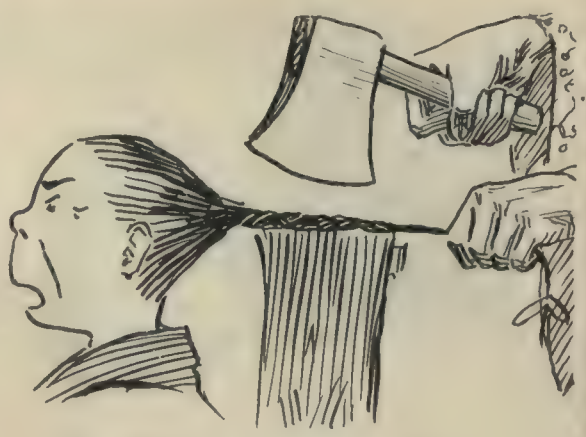
when they blow. These Links cost but a trifle and assure a complete break in the circuit at the required overload.



There's no need to use an extra new fuse every time one blows when the *efficient and safe* Economy fuse can be renewed over and over again with our *tested* Renewal Links at a saving of 80% of fuse maintenance expense under old-style, wasteful methods.

Write now for Bulletin No. 17 and our catalog.

Economy Fuse & Mfg. Co.
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Chicago, Ill.



The Passing of the Pigtail

Only one of the big features of the

LINDALL BRUSH HOLDER

is the large contact surface between brush and holder, eliminating the troublesome pigtail.

It is a holder and guide that will take the brush as it comes—without any preparation of cutting, etc.

It gives the brush an even, steady pressure at all degrees of wear.



Bulletin on Request

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An Insulating Varnish That Invites

The "Try Before You Buy" Test

What *we* say about "Chinalak" isn't a fraction as important as what *you* say after you have tried it.

It's natural for us to assert that it is truly *oilproof, waterproof* and *heat-resistant*. But we don't want you to rest upon our mere assertion that "Chinalak" has all the qualities that you require of insulating paint.

That's why we say "Try before you buy."

A gallon sample—clear or black—is yours for the asking!



JOHN C. DOLPH CO.

THE INSULATION SPECIALISTS

NEWARK, N. J.



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of your advertisements, and time to return them with corrections

Copy Must Be in Our Hands Two Weeks in Advance of Publication Date

Copy Changes. If no proofs are desired your advertisements should be in our hands Wednesday of the week preceding date of publication, otherwise your latest advertisement in accordance with schedule will be repeated.

New Advertisements (not changes of copy) can usually be accepted up to noon Wednesday of the week of publication, but no guarantee can be given as to location or proofs or indexing.

Searchlight Advertisements (Proposals, Wants, For Sale, etc.) received as late as 10 A. M. Thursday will be published if there is space available in the pages that go to press last. The paper is dated and mailed Saturday.

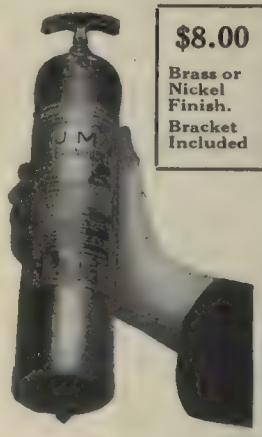


THESE are not arbitrary rules. We do our best to give our advertisers what they want—work overtime if necessary—but each advertising form has to be on the press at a specified time. That is why we cannot guarantee proof or location unless we have copy on time. We want our advertising space to work at maximum efficiency for our advertisers.

The Paper is dated and mailed Saturday

Electric Railway Journal, 239 W. 39th St., New York

Fight electrical arcs in safety—with the J-M Fire Extinguisher



$8.00
Brass or Nickel Finish.
Bracket Included

"A little knowledge is a dangerous thing," particularly around a high tension circuit, where attempts to break an arc with a fluid of low resistance may prove fatal.

We recommend the J-M Fire Extinguisher because we've proved that it safeguards the operator. Comparative tests for dielectric strength of transil oil and J-M Extinguisher Fluid made by a large electrical laboratory gave the following results:

Spark at
Transil Oil .....26,000 volts
J-M Extinguisher Fluid.....31,000 volts

Arc Maintained at
Transil Oil.....38,000 volts
J-M Extinguisher Fluid.....41,500 volts

(*Electrodes immersed in the liquid, with distance of 0.02 inches between points.*)

Thus J-M Extinguisher Fluid is at least as strong dielectrically as the oil used in high tension switches. And it's deadly to all incipient fires, yet harmless to skin or machinery—non-corrosive and leaves no residue.

The J-M Fire Extinguisher can be used in the hard-to-get-at places. Discharged either by pumping or by air pressure previously pumped up and temporarily stored—an exclusive J-M feature. Buy from your local dealer, put a J-M at each danger point, and be prepared for emergencies.

The J-M Fire Extinguisher is inspected, approved and labeled by the Underwriters' Laboratories, Inc., under the direction of the National Board of Fire Underwriters.



Serves more people in more ways than any other Institution of its kind in the world.

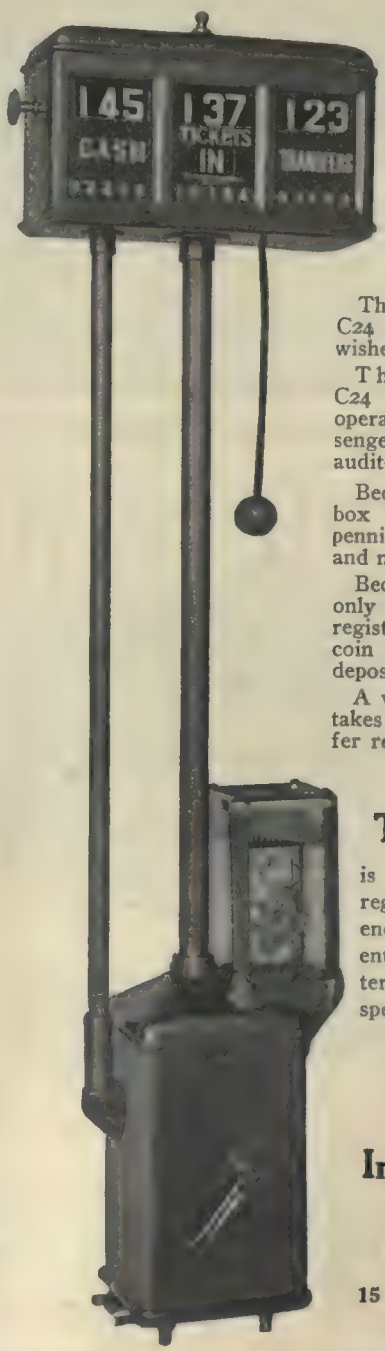
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NEW YORK CITY
Branches in 55 Large Cities

INTERNATIONAL C 24

4.8 Per Cent was added by this register to the revenues of the Lincoln Traction Company, Lincoln, Nebraska.

Their use also resulted in a material saving in cost of tickets and in the accounting department.

If you are operating single-end or center-entrance cars and want unimpeachable registration of every class of fare—



Cash—Metal Ticket Paper Transfer

The International C24 will meet your wishes to perfection.

The International C24 simplifies fare operations for passenger, conductor and auditor.

Because one farebox hopper takes pennies, nickels, dimes and metal tickets.

Because one handle only is required to register separately the coin and tickets so deposited.

A vertical pull-cord takes care of transfer registration.

The C 24

is the all-around register for single-end and center-entrance cars. Better send us your specifications.

The International Register Company
15 South Throop St.
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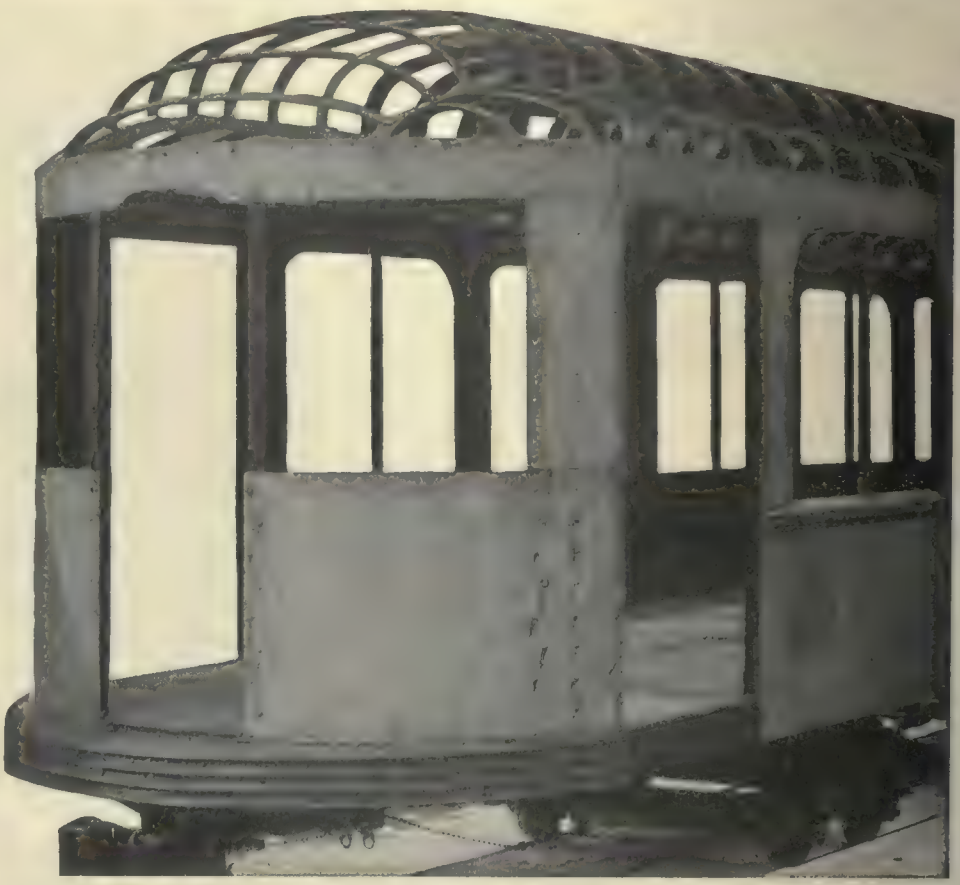
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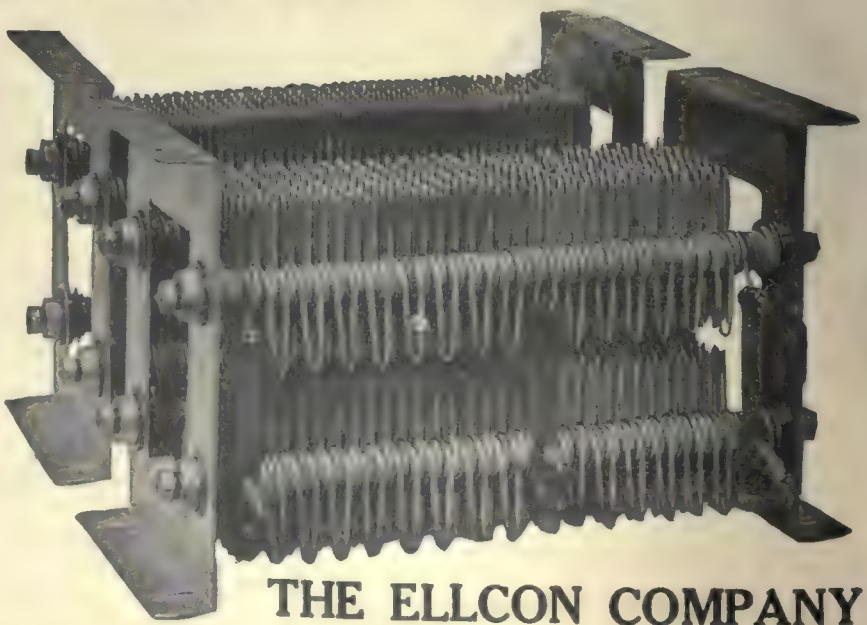
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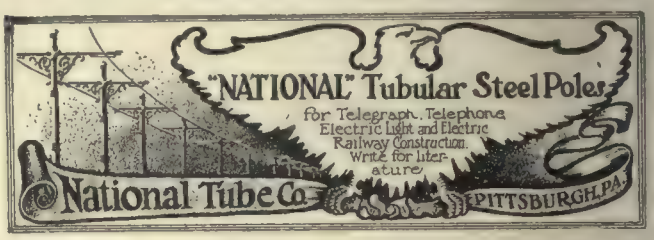
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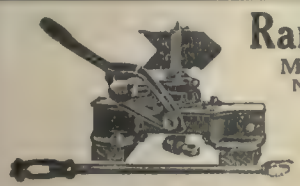
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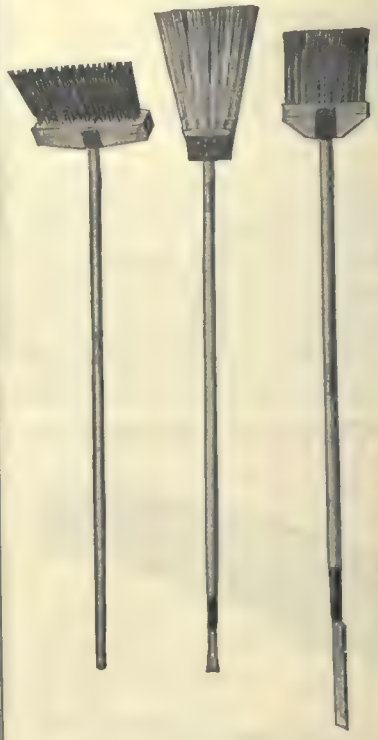
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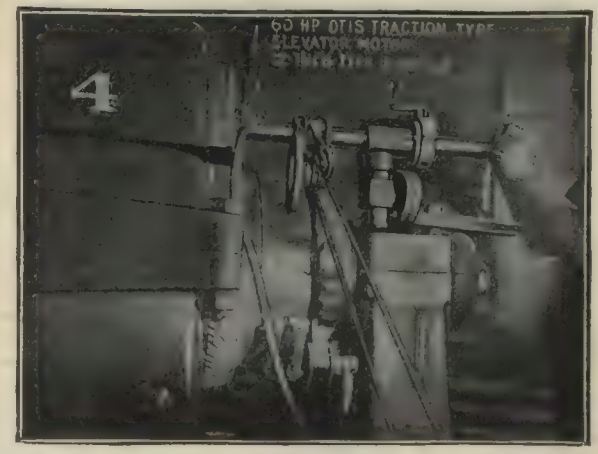
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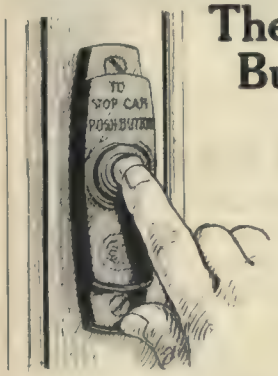
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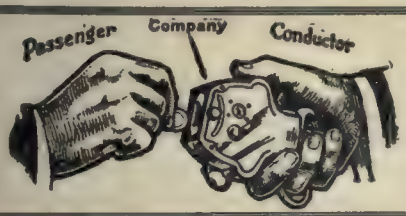


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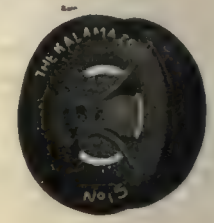
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The Garland Ventilator Co.—Ventilators.
The Joliet Railway Supply Co.—Self-Centering Center Plates and Anti-Friction Side Bearings.
The Car Lighting Improvement Co.—Watson Lighting Regulator.
The Anderson Brake Adjuster Co.—Brake Slack Adjusters.

Chicago District Representatives for:
The Drew Electric and Mfg. Co.—Line Material.
Columbia Machine Works & Malleable Iron Co.—Car & Shop Equipment.
Miller Trolley Shoe Co.—Trolley Shoe.

1508 Fisher Building, CHICAGO

TULC

MANY SYSTEMS ARE USING TULC after first making most thorough tests under all conditions. Such tests have shown that it will cut lubrication costs in half.

THE UNIVERSAL LUBRICATING CO.
Schofield Building CLEVELAND, O.

UNION SPRING & MFG. CO.

SPRINGS
COIL AND ELLIPTIC

M. C. B. Pressed Steel Journal Box Lids

General Office: First Nat'l Bank Bldg.
PITTSBURGH PA.

Works: New Kensington, Pa.

50 Church St., New York. 1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

"Boyerized" Products Reduce Maintenance

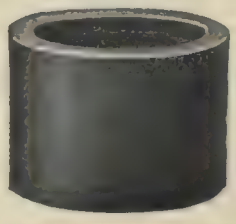
Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

LONGWEAR BUSHINGS
For Brake Gear

Hardened Steel
Accurate
Uniform



also LONGWEAR BRAKE PINS to Specifications

E.G. Long Company

50 Church Street New York

The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

SEARCHLIGHT SECTION

IMMEDIATE SHIPMENT

1000 K. W. 575 Volt Direct Connected Generating Set

1—1000 KW. General Electric type M.P. form H, 575 volt, 1739 amps. 14 pole generator direct connected to 24 and 48 x 42" McIntosh & Seymour cross compound vertical engine, speed 120 r.p.m.

200 Kilowatt 60 Cycle Rotary Converters

2—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 r.p.m., with starting motors, also transformers if desired.

150 Kilowatt 60 Cycle Rotary Converters

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with 4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

25 Cycle Rotary Converters

2—200 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.
2—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

Transformers

3—375 KVA. General Electric type, 60 cy., 9600 volts prim., 575 v. secy.
4—100 KW. Westinghouse transformers, oil insulated, single ph., 60 cy., 2300 v. primary, 360 v. secondary.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. primary, 430/362 v. secondary.
6—75 KW. General Electric, 13,200-6600 volts, 385 volts sec. Transformers.

Railway Motor

1—75 to 90 HP. Westinghouse No. 112 Railway Motor, newly rewound, practically new.

IMMEDIATE DELIVERY

ARCHER & BALDWIN
114-118 Liberty Street New York City
TELEPHONE 4337-4338 RECTOR

MACGOVERN & COMPANY, Inc.

114 LIBERTY STREET NEW YORK CITY

Steam and Electrical Machinery

Air Compressors, Pumps, Hoists, etc.

FOR SALE

4—180 H.P. Heine boilers, 125 lb. pressure.
2—375 H.P. Heine boilers, 125 lb. pressure.
4—500 kw. 2300-volt 3-phase 60 cycle vertical 175 lb. steam pressure, 2-stage, G.E. turbines with 2000 sq. ft. Worthington condensers.
1—36 x 60 Fulton Iron Works engine direct connected to G.E. 800 kw. 550 volt D.C. generator.
1—36 x 48 Edward P. Allis engine direct connected to G.E. 800 kw. 550 volt D.C. generator.

Chattanooga Railway & Light Company
Chattanooga, Tennessee

For Sale

Five Open Cars. Length over all 30 ft. Seating capacity 50. Two fully equipped for operation. **First-class condition.** Can offer very attractive price to anyone interested.

Albany Southern Railroad Co.
Rensselaer, N. Y.

For Sale

Two 500 Kilowatt, 6-phase, 25-cycle, 6600 volts, ROTARY CONVERTERS for operation on Edison three-wire system, with transformers, machine panels; 4 feeder panels and auxiliary apparatus, consisting of fans and motors, induction regulators and starting panels. This equipment is of the General Electric Company's manufacture and is in first-class condition. *The Kansas City Rys. Co., Purchasing Dept., Kansas City, Mo.*

CARS FOR SALE

OPEN and CLOSED MOTOR and TRAIL
Write for Price and Full Particulars to
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg. Philadelphia, Pa.

COMPLETE ARMATURES FOR SALE
FOR ALL THE STANDARD STREET RAILWAY MOTORS
GET OUR PRICE WE CAN SAVE YOU MONEY
America's Greatest Repair Works
CLEVELAND ARMATURE WORKS, Cleveland, O.

Get Your Wants into the Searchlight

SEARCHLIGHT SECTION

Get your Wants into the Searchlight

ADVERTISING RATES

Under "Positions Wanted," including Salesmen looking for new connections, Evening Work Wanted, etc., undisplayed advertisements cost **three cents a word**, minimum charge 50 cents an insertion, **payable in advance.**

Under "Positions Vacant," including Agents and Agencies Wanted, Representatives Wanted, Salesmen Wanted, Partners Wanted, Business Opportunities, Employment Agencies, and Miscellaneous For Sale, For Rent, and Want ads; also Auction Notices, Receivers' Sales, Machinery and Plants For Sale or Wanted, undisplayed advertisements set solid in one paragraph, cost **five cents a word**, minimum charge $1.50 an insertion.

Machinery advertisements (undisplayed) set with a paragraph for each item, or tabulated, 30 cents a line, minimum 5 lines.

If replies are in care of any of our offices, allow five words for the address.

All advertisements for bids (Proposals) cost $2.40 an inch.

ADVERTISEMENTS IN DISPLAY TYPE

cost as follows for single insertions:

⅛ p. (1⅛x3⅜ ins.)	$5.00	1 in. (1x2¼ ins.)	$3.00
¼ p. (2⅜x3⅜ ins.)	10.00	4 inches (4x2¼ ins.)	11.60
¼ p. (5x3⅜ or 2⅜x7 ins.)	20.00	8 inches (8x2¼ ins.)	22.40
½ p. (10¼x3⅜ or 5x7 ins.)	40.00	15 inches	40.50

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

1 page	$80 a page	18 pages	$56 a page
3 pages	72 a page	26 pages	52 a page
6 pages	64 a page	32 pages	50 a page
9 pages	62 a page	40 pages	48 a page
12 pages	58 a page	52 pages	45 a page

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE

Fare Boxes for Sale

100 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

52" Wheel Turning Lathe

For sale at a bargain—Niles 52" wheel turning lathe, motor drive, at a bargain. Apply

L. Brenner & Co., Lebanon, Pa.

INTERURBAN CARS

3—51 ft. Combination Passenger & Baggage. (4 ft. 8½" gage)
Seating Capacity 45.
Trucks Brill No. 27.
4 Motors Westinghouse 310. H. L. Control.

2—52 ft. 13 Bench Open Trailers.
Steel Underframe.
Trucks Brill No. 1 M. C. B.

All first-class condition.
Immediate delivery.
Write, wire, or 'phone

WALTER A. ZELNICKER SUPPLY COMPANY
ZELNICKER
St Louis

1st Nat'l Bk., Chicago. Hennen Bldg., New Orleans
Main Office, 325 Locust St., St. Louis

POSITIONS WANTED

AUDITOR—Certified public accountant desires connection with property located either in South or East. Several years' experience as executive and auditor for electric railway properties, both city and interurban. Young man, thoroughly up to date. Box 1375, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

AVAILABLE for busy executive: Assistant with unusual qualifications and experience. College graduate; Member of Bar. Six years in various executive offices of large railway and lighting company. Now law clerk for legal and claim departments. Can take charge of legal and claim work or other detail. Ability backed by judgment and experience. Box 1223, Elec. Ry. Jour.

ELECTRICAL engineer, married, 34, 7 years' experience; overhead construction and maintenance; high tension, subway, bonding, electrolysis, signals. Wants position as distribution engineer or superintendent of overhead. References including present employers. Box 1354, Elec. Ry. Jour.

EXECUTIVE—Experienced executive desires connection with electric railway or large manufacturing property; several years' experience with industrial and electric properties as auditor and manager. First-class record and references. Box 1374, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

GRADUATE electrical engineer, age 35, 13 years' experience in railway construction engineering and management, open for position March 15 as superintendent of motive power, efficiency engineer or general manager. Box 1371, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

MANAGER—Technical engineer; 14 years' experience; all utilities, with two large syndicates; 5 years general manager in city 100,000 population. Position desired, temporary or permanent, any location. Box 1378, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MANAGER.—Position as manager of city or interurban electric railway. Eleven years' executive and operating experience in all departments. Full particulars upon request. Box 1349, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MASTER mechanic with good clean record a number of years with present employers on large electric railway system. Have experience in Eastern, Central and Southern States with all classes of equipment. Will soon be open for proposition. Box 1373, Elec. Ry. Jour.

POSITIONS WANTED

POWER plant engineer, 2,000 to 20,000 K.W. American, 37, 6 years in present position, power superintendent, traction company. A good executive, able man on maintenance and erecting. Familiar with modern equipment and present-day practices. Best reference and sound record for efficient results. Box 1368, Elec. Ry. Journal.

PUBLICITY EXPERT, graduate mechanical engineer, former newspaper editor, now editor publication prominent in railway field, wants to talk over your publicity problems with you. Box 1365, Elec. World, 935 Real Estate Trust Bldg., Philadelphia, Pa.

TRAFFIC man—Ten years' experience, steam and electric. Age, 27. Single. Best references. Now traffic manager electric line. Desires change. Position with mercantile house preferred. Box 1376, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

TWENTY years' experience in street railway operation. Several years as general superintendent of large city and suburban electric system. Best of references. Box 1377, Elec. Ry. Journal.

POSITIONS VACANT

ENGINEER wanted to act as chief engineer in large central station power house in an Atlantic seaboard city. Must be qualified to take charge of an 80,000 k.w. plant and experienced in handling Curtiss turbines, Jett and surface condensers, and Taylor stokers. Applicant must have experience in large central station plants. State age, experience and salary expected. If employed, give name of company and reason for changing. All replies strictly confidential. Box 1355, Elec. Ry. Jour.

METER testers fully experienced in direct and alternating current meter testing wanted. Location 100 miles from New York City. State age, experience, salary expected and give reference as to honesty and integrity. Box 1367, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Philadelphia, Pa.

AGENTS AND SALESMEN

Salesman Wants Position

American, 35, technical education, 12 years' actual mechanical and electrical engineering experience. Sales ability; 2 years selling. Box 1370, Elec. Ry. Journal.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.
If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will probably furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device Co.

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Amusement Devices.
Este Co., The J. D.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axles.
National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers.
National City Co.

Batteries, Dry.
Johns-Manville Co., H. W.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Hardy & Sons Co., Wm. A.
Long Co., E. G.
More-Jones Brass & M. Co.
Post & Co., E. L.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White.

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Hess-Bright Mfg. Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Boiler Tubes.
National Tube Co.

Bond Clips.
Electric Railway Improve. Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improve. Co.
Ohio Brass Co.
Oxweld Acetylene Co.
Prest-O-Lite Co., Inc.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Bonds, Welded.
Lincoln Bonding Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Int'l Cresosoting & Constr. Co.
Lindsley Bros. Co.
Ohio Brass Co.
Union Electric Co.

Brake Adjusters.
Holden & White.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
General Electric Co.
Holden & White.
Long Co., E. G.
National Brake Co.
National Safety Device Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Bridges and Buildings.
American Bridge Co.

Brooms, Track, Steel or Rattan.
Paxson Co., J. W.
Zelnicker Supply Co., W. A.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eurego Co.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
Dixon Crucible Co., Jos.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunkers, Coal.
American Bridge Co.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co. John.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co. Inc. W. R.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Car Stops, Automatic.
Consolidated Car-Heating Co.

Castings, Brass.
Eureka Co.
Frankel Connector Co.
More-Jones Brass & M. Co.

Castings, Composition or Copper.
Anderson Mfg. Co., A. & J. M.
Eureka Co.
Horne Mfg. Co.

Castings, Gray Iron and Steel.
Amer. Brake Shoe & Fdy. Co.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdy. Co.
Bemis Car Truck Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Horne Mfg. Co.
Long Co., E. G.
Ohio Brass Co.
Union Electric Co.
Wood Co., Chas. N.

Ceiling, Car. (See Heading.)

Charging Sets, Storage Battery.
General Electric Co.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps.
Frankel Connector Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. (See also Snow-Plows Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.

Cleats, Car Wiring.
General Electric Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature & Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The
Johnson Fare Box Co.



Is YOUR Capital Gathering Cobwebs?

It is if any of it is tied up in old field coils.

We can help you put these coils to work again. Send them to us and let us reconstruct them. We remove the old insulation—clean and anneal the copper—then reinsulate it with

SALAMANDER PURE ASBESTOS

which is, in itself, a guarantee against carbonization due to age and breakdown under overload. We then rewind the wire into new coils having just the same characteristics as the old ones.

It's *better* than selling your old coils—and *cheaper* than buying new ones, for our only charge is for the actual insulation used. Ask us to demonstrate the economy of our method.

Independent Lamp & Wire Co., Inc.

Offices:
1737 Broadway, New York

FACTORIES:
York, Pa., and Weehawken, N. J.

Weston

Model 1

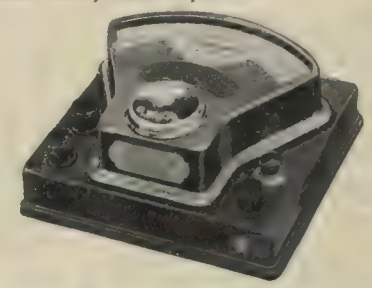
D. C. Portable Voltmeters

They are guaranteed to an accuracy of 1/5 of one per cent (in terms of full scale length). They are dead-beat. Each scale is hand-calibrated and has a mirror over which the knife-edge pointer travels. By bringing the pointed tip into line with its image, readings may be made within 1/10 of a division at any part of the scale. In mechanical and electrical workmanship, these Voltmeters practically attain perfection. In external appearance they are very handsome. The metal case has an exceedingly durable royal copper finish. The base is of selected mahogany, highly polished.

A full description of Model 1 Voltmeters will be found in Bulletin No. 501, which will be mailed on request.

Weston Electrical Instrument Co.
21 Weston Ave., Newark, N. J.

New York
Chicago
Boston
Phi'adelphia
St. Louis
Buffalo
Detroit
Pittsburg
Richmond
Cincinnati
Cleveland
Denver
San Francisco
Toronto
Montreal
Winnipeg
Vancouver



Service

You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

American Brake Shoe & Foundry Co.
30 Church St., New York
McCormick Bldg., Chicago — Chattanooga, Tenn.

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago — Washington, D. C.

RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels

Special Agents for { Tool Steel Gear & Pinion Co. / Johnson Fare Box Co. / C. & C. Electric & Mfg. Co. / Holden & White }

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cameron Elec. Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co. Inc. W. R.
Long Co., E. G.
Westinghouse Elec. & M. Co.

Compressors, Air.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits, Underground.
Johns-Manville Co., H. W.

Connectors, Solderless.
Frankel Connector Co.
Horne Mfg. Co.

Controller Fingers.
Horne Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
American Bridge Co.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works.
Union Electric Co.

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Couplings, Conduit.
Horne Mfg. Co.

Cranes, (See also Hoists.)
Niles-Bement-Pond Co.

Creosoting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

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Wheel Guards. (See Fenders & Wheel Guards.)

Wheel Presses. (See Machine Tools.)

Wheels, Car, Cast Iron.
Bemis Car Truck Co.
Griffin Wheel Co.
Long Co., E. G.

Wheels, Car, Steel and Steel Tired.
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Carnegie Steel Co.
Standard Steel Works Co.

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General Electric Co.
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Holden & White.
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Nuttall Co., R. D.
Star Brass Works.
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Whistles, Air.
General Electric Co.
Ohio Brass Co.

Winding Machines. (See Coil Banding and Winding Machines.)

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American Steel & Wire Co.
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"Light-Safety"
units spell
ECONOMY—
EFFICIENCY—
RESULTS

We specialize in this class of cars and trucks

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Car Company

GURNEY

RADIO-THRUST
BALL BEARING
JOURNAL BOXES

Will minimize coal shortage troubles by cutting down your fuel requirements by 10 to 15 per cent.

GURNEY BALL BEARING CO.
CONRAD PATENT, LICENSEE
Chicago JAMESTOWN, NEW YORK New York



Dho

The poorer class natives of India dine off the rudest, cheapest earthenware platters and there is a caste prejudice against *dho,* which means using the same dish twice.

Thus a brisk demand for cheap pottery is created and the man you call the humble potter makes good money by furnishing material that is thrown away before it has performed any distinct service.

That may explain why some cheap-carbon-brush makers are enabled to stay in business—their product is reordered with such great rapidity that the year's sales mount to large figures. The poor brush user thinks that he can afford to use large quantities because the price is dirt cheap.

He forgets that by paying a *little more* for prescribed Morganite brushes he can use a *lot less* brushes, thereby protecting his bank account and commutators.

Check up your *yearly* brush costs.

The Morgan Crucible Company Limited
120 Liberty St, New York City

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150 Steuart Street, San Francisco, Cal.

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NOTICE TO ADVERTISERS:

Printing begins on Tuesday of each week.
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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Penn Avenue, Pittsburgh, Pa.

It Would Cost a Great Deal to Replace the Rail

on this street and other business avenues of American cities.

The cost of the new rail, big as that may be, is really a small item compared with the traffic losses incident to relaying and replacing track and pavement.

TITANIUM TREATED RAIL

is the choice of Boston-Brooklyn-Philadelphia-Pittsburgh-Washington-St. Louis-Los Angeles-San Francisco and other big systems, because of the opportunity it offers to

PUT OFF FOR YEARS

The Costly Evil of Track Upheaval

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

Processes and Products Patented

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Niagara Falls, N. Y.

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Reg. U. S. Pat. Off.
TRADE MARK.

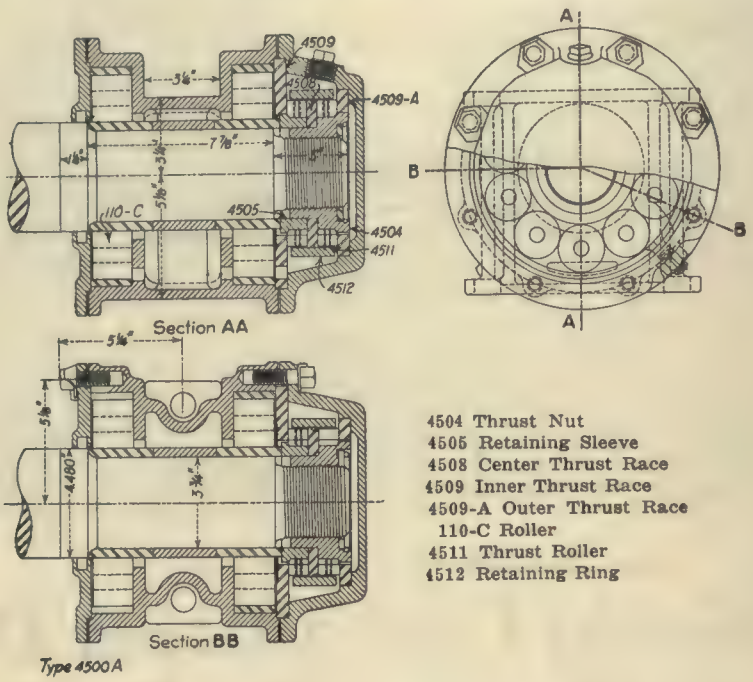
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Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England

Syracuse Installs Eighty Railway Roller Bearings



4504 Thrust Nut
4505 Retaining Sleeve
4508 Center Thrust Race
4509 Inner Thrust Race
4509-A Outer Thrust Race
110-C Roller
4511 Thrust Roller
4512 Retaining Ring

Here is a drawing of the type 4500-A Railway Roller Bearings, eighty of which have gone on ten new Peter Witt center-door pay-leave cars for Syracuse.

In equipping these cars, the railway company sought for the most efficient devices available for economical, efficient and reliable car service.

If the decision of Syracuse is significant to you, write us on how to

Put Railway Roller Bearings on Your Cars



The Railway Roller Bearing Co.

Syracuse, N. Y.

THE BRILL INTERURBAN TRUCK

The Brill interurban truck, type 27-MCB, is built in seven standard sizes ranging from a load capacity per pair of 46,000 lb. up to 120,000 lb.

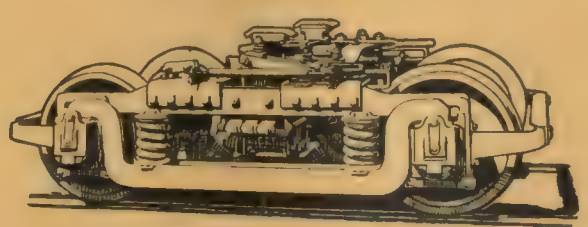
The solid-forged side frames not only are proof against failure thru crystalization, but their ample surfaces permit the use of fold-over gusset plates and single- and double-corner brackets for the attachment of the transoms, and for a powerful connection of the end frames.

Three very important improvements give these trucks their singularly smooth riding qualities by allowing free motion to the complete spring system under all conditions.

These improvements are the Brill Graduated Spring System, the Brill Bolster Guide and the Brill Side-Swing Dampener.

In combination they produce an ease and steadiness of riding on tangents, curves, during acceleration and braking that is distinctly noticeable.

The Brill Bolster Guide, together with the Graduated Spring System, protects the car from the choppy, vertical motion which commonly is set up in the trucks by brake application or by motor acceleration and the Side-swing Dampener restricts, without preventing, the side easement.



"Look it up in Brill Magazine"

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR CO., CLEVELAND, OHIO
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.
CIE J. G. BRILL, 49 Rue des Mathurins, PARIS



6502

General Electric Company

General Offices:

Sales Offices

ELECTRIC RAILWAY JOURNAL

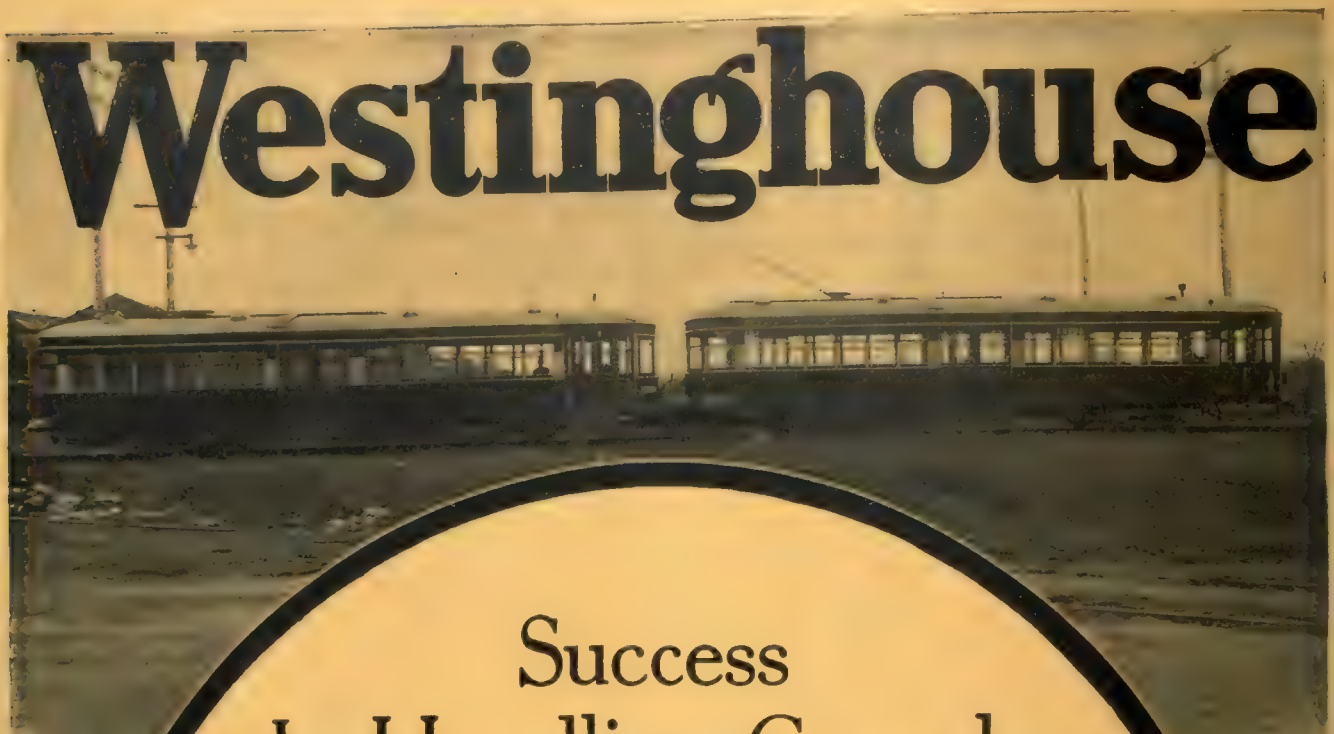
York, February 24, 1917 McGraw Publishing Co. Inc. Vol. 49, No. 8 10c a c

ENGINEERS and CONSTRUCTORS
A purely engineering organization with nothing to sell except services
W·C·K

THIS 46-stall roundhouse is part of the engine terminal built at Sayre, Pa., for the Lehigh Valley Railroad. This terminal was not only built on the site of a railway yard in constant use but was over the locks of an abandoned canal which made excavation very difficult. In spite of the difficulties it was finished in a single summer and was under cover before snow. We have built similar terminals for the Lehigh Valley at Manchester, N. Y., and at Suspension Bridge.

WESTINGHOUSE CHURCH KERR & CO
Engineers & Constructors
37 WALL STREET, NEW YORK CITY

Westinghouse



Success In Handling Crowds

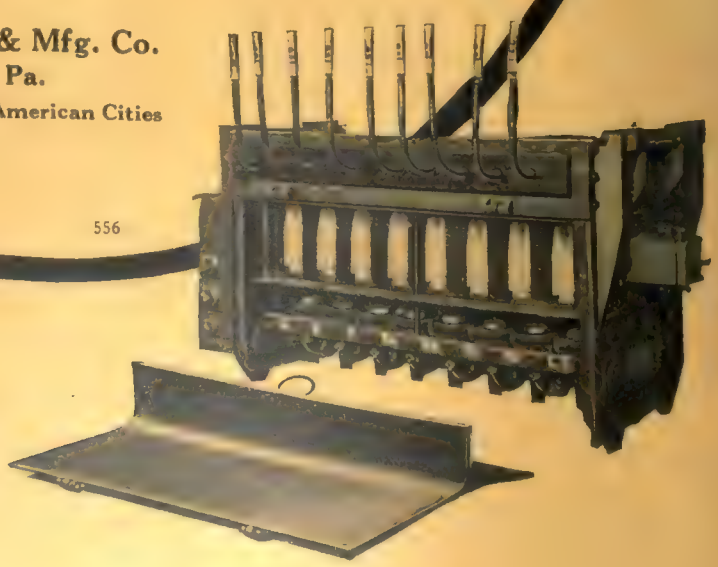
The problem of handling rush-hour and holiday crowds quickly and safely has been successfully solved in the city of Toledo, Ohio, by the introduction of train service with—

Westinghouse HL Control

The sixty new cars, recently placed in commission by the Toledo Railways & Light Co. have double equipments of Westinghouse No. 515 Motors, together with HL Control. This means that in making up trains there are no dead trailers. Each car is a complete unit in itself, and is operated with a maximum of economy, flexibility and safety, or as part of a train.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.
Sales Offices in all Large American Cities

556



W
WESTINGHOUSE ELECTRIC

ELECTRIC RAILWAY JOURNAL

VOLUME XLIX, No. 8 NEW YORK, FEBRUARY 24, 1917 PAGES 333 TO 374

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JAMES H. MCGRAW, President. A. E. CLIFFORD, Secretary. J. T. DE MOTT, Treasurer. H. W. BLAKE, Editor.

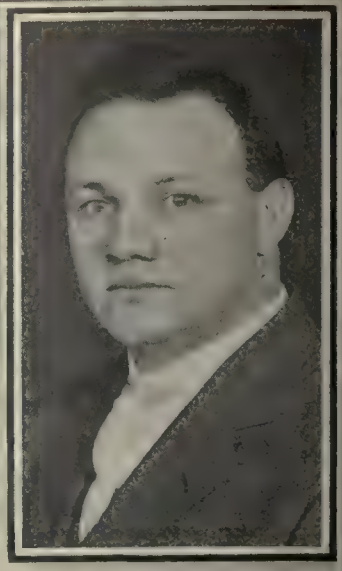
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Circulation of this issue 7100 copies





The Westinghouse Inspector-Specialist saw at a glance what was wrong and pointed it out, saying: "The piping is wrong. They did not follow the blue print. The main reservoir pipe is connected to the brake cylinder port of the triple valve. Correct that error and put the car on it's run."



The Message from the Car Barn

"Yes, Mr. President, thanks to that Westinghouse Inspector-Specialist, we have all of those ten new cars in service earning nickels. We're handling a record holiday crowd and cleaning up corners at every stop. We made a slip-up in the piping. He set us right—came 500 miles on our wire at his own expense—made no kick, even though the fault was ours."



Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

PITTSBURGH:
Westinghouse Building

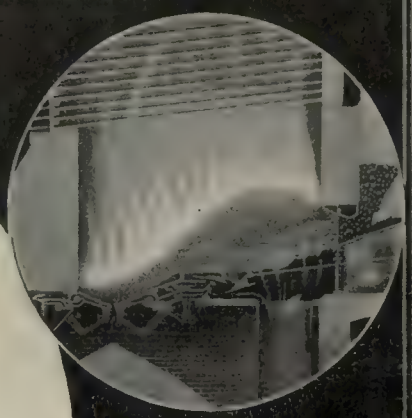
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Railway Exchange Building

TRADE MARK

NEW YORK:
City Investing Building

ST. LOUIS:
Boatmen's Bank Building

Westinghouse Underfeed Stokers



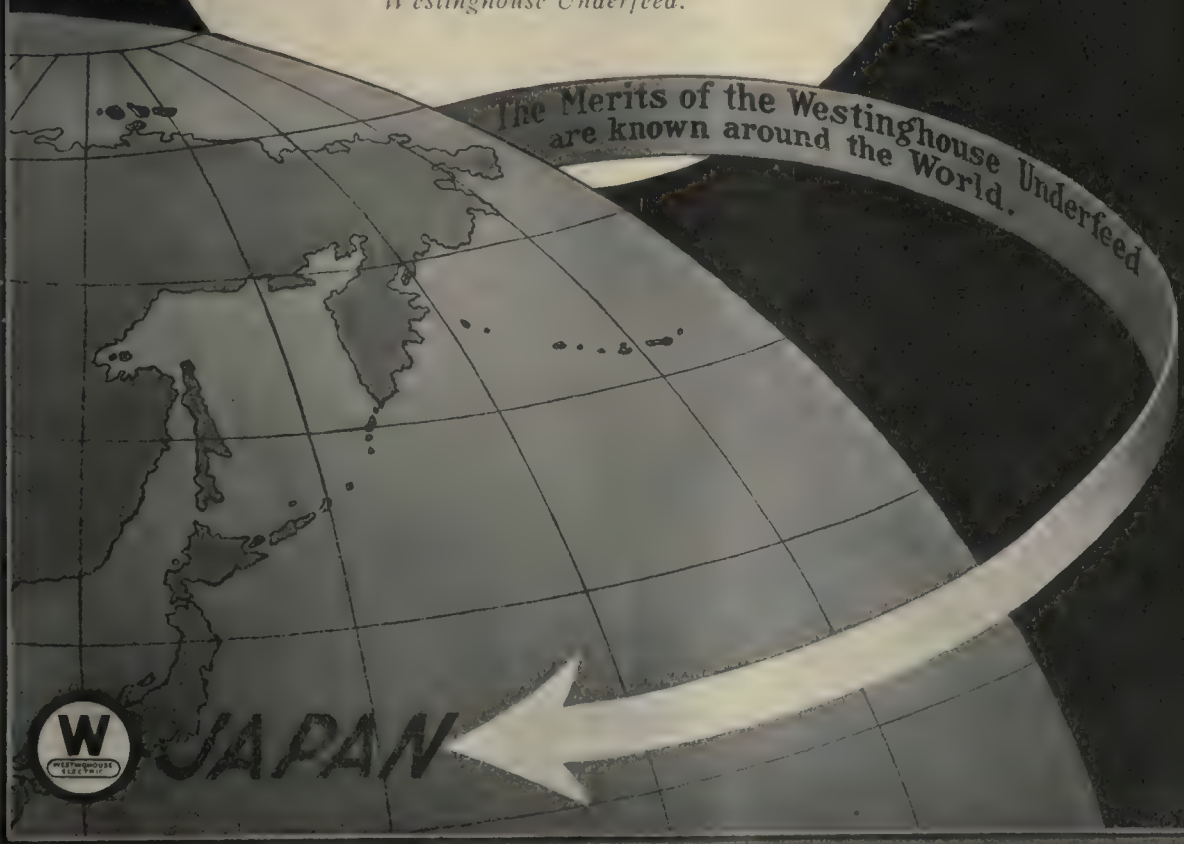
Progressive Japan

Selects Westinghouse Underfeed

Twenty-seven units—two to the Naqoya Electric Light Co., twenty to the Osaka Electric Light Co., and five to the Imperial Steel Co.

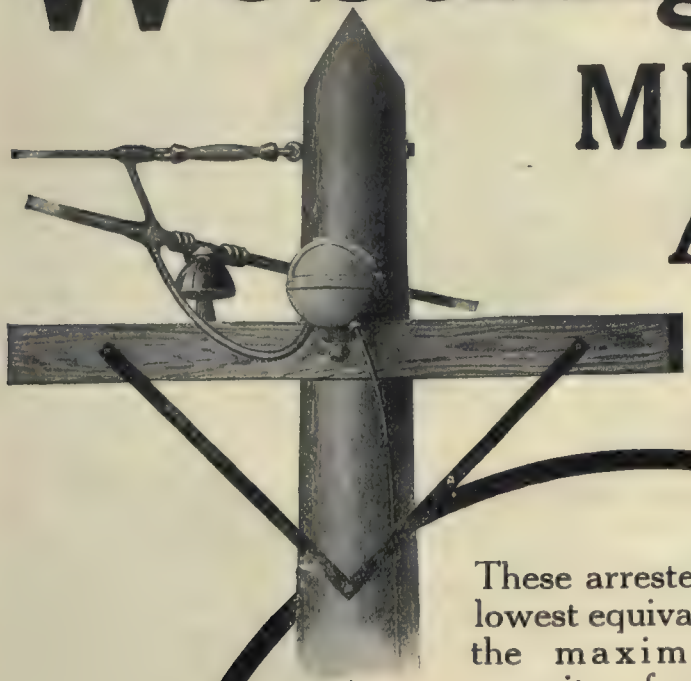
Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

—There is wonderful reserve power in the Westinghouse Underfeed.



Westinghouse

MP Lightning Arresters



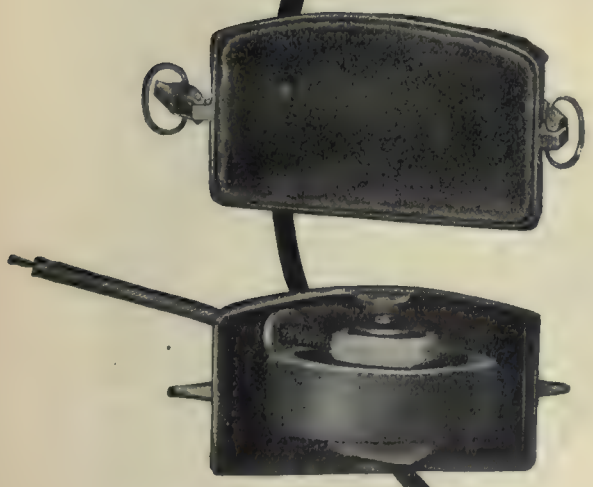
For Railway Lines and Cars



These arresters have the lowest equivalent gap and the maximum discharge capacity of any arrester for similar service, except the condenser and electrolytic types.

One or two MP Arresters mounted on each car give ample protection under ordinary conditions, and are provided for open or conduit wiring as may be desired.

In addition to the arresters on the cars, auxiliary protection should be provided in the form of MP Arresters mounted on the line, about five to the mile. These line arresters relieve the car arresters from excessive duty by discharging static from the line so that complete protection is more nearly assured to the apparatus on the car.



584

We have two Leaflets Nos. 3872 and 3917 giving instructions on the installation and care of lightning arresters on railway lines and cars. Send for them.

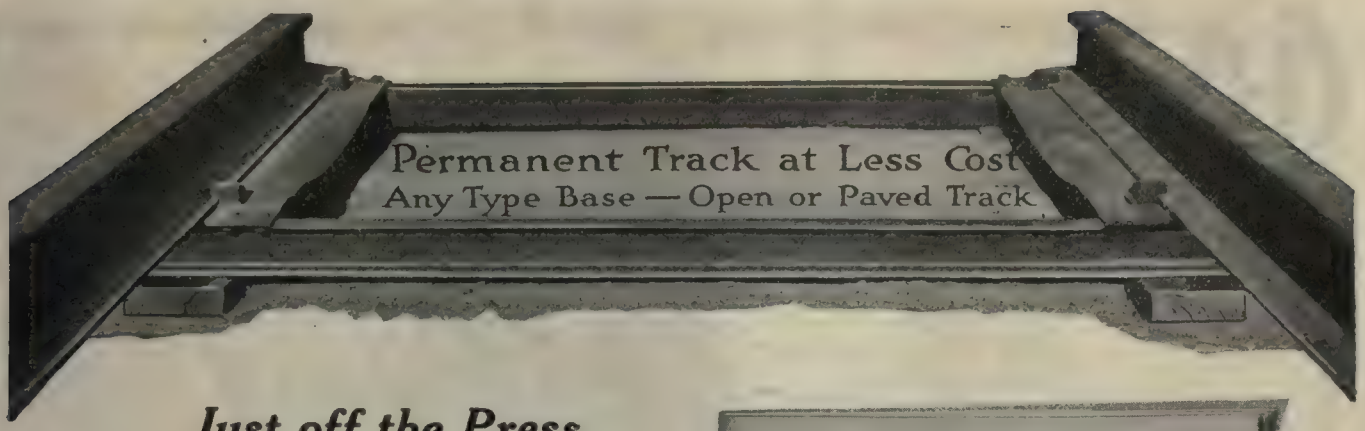
MP Arresters are suitable for all voltages up to 750 Direct or Alternating Current.

W WESTINGHOUSE ELECTRIC

Westinghouse Electric & Manufacturing Company

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*W. E. & M. Co. of Texas.



Just off the Press

Our Catalog of

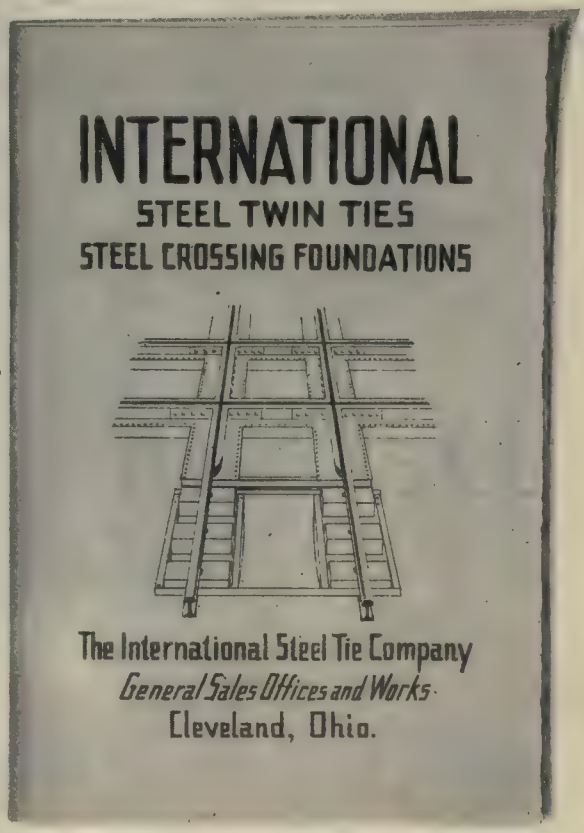
Data on Track Installations

of International Steel Twin Ties and International Steel Crossing Foundations.

Way engineers will find this booklet of interest and value in solving this year's track problems. It shows how many of the leading track builders are obtaining permanent track at reasonable cost and why this result is produced with Steel Twin Ties. It shows why our crossing foundations are the solution for one of the track engineers' most difficult problems.

Page 12 of this Catalog

sets forth a design and specifications for track construction which will enable you to save 50% in construction materials and labor by using International Steel Twin Ties instead of wooden ties. It will also tell you how to more than double the life of your crossings and reduce their maintenance and prevent rail creepage.



This catalog contains data you should have in planning for the track you will build this year. It clearly pictures the latest types of track built by some of the leading railways and suggests how you can get more permanency at less cost.

It's a book that should be in the hands of every progressive engineer who has to do with track construction. Write today for your copy.

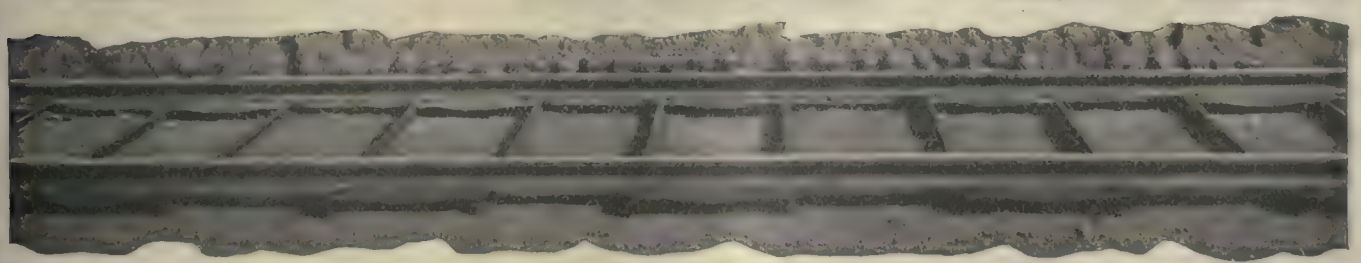
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal. | San Francisco, Cal. Seattle, Wash. | R. J. Cooper Co., Salt Lake City, Utah. | J. E. Lewis & Co., Dallas, Texas. | Maurice Joy, Philadelphia. | William H. Ziegler, Minneapolis, Minn.





Installing an O-B Type D Frog

Defeating the Weather

Without taking off his heavy mittens the lineman can install O-B Trolley Frogs—Types E and D.

For the type D has only six parts—pan, clamping wedge, bolt and three cam tips, and the type E nine including two clamping bolts with lock washers. Consequently there is no fumbling with small, elusive parts. In other words, valuable time is saved and there is a minimum interference with traffic.

O-B Trolley Frogs

are fully as good in service as they are easy to install.

Cam tips, made of ductile bronze, form a smooth path for the wheel from wire to pan. They absorb the heaviest wear and are readily renewable.



TYPE D FROG—For City Service using same general type of cars



TYPE E TROLLEY FROG (Pat.)—For City and Interurban service, suitable for different types of cars and high speed service

O-B Trolley Frogs and other devices with cam tips are described and listed in Catalog No. 16

The Ohio Brass Co.

Mansfield, Ohio



O-B TROLLEY RETRIEVER (Pat.)—For high-speed service

Simplicity

There is nothing complicated about O-B Retrievers.

When the pole jumps, the powerful retrieving spring is released and the pole is pulled down out of harm's way—surely and swiftly.

To get the wheel on the wire again, the conductor must reset the Retriever. Consequently it's always ready.

Simplicity in the working parts keeps the O-B Retriever on the cars. It is a stranger to the repair shop.

O-B Retrievers are for high-speed service. On your city cars use O-B Catchers. They have the same simple, rugged character as the Retrievers.

Write for information about our trial offer.

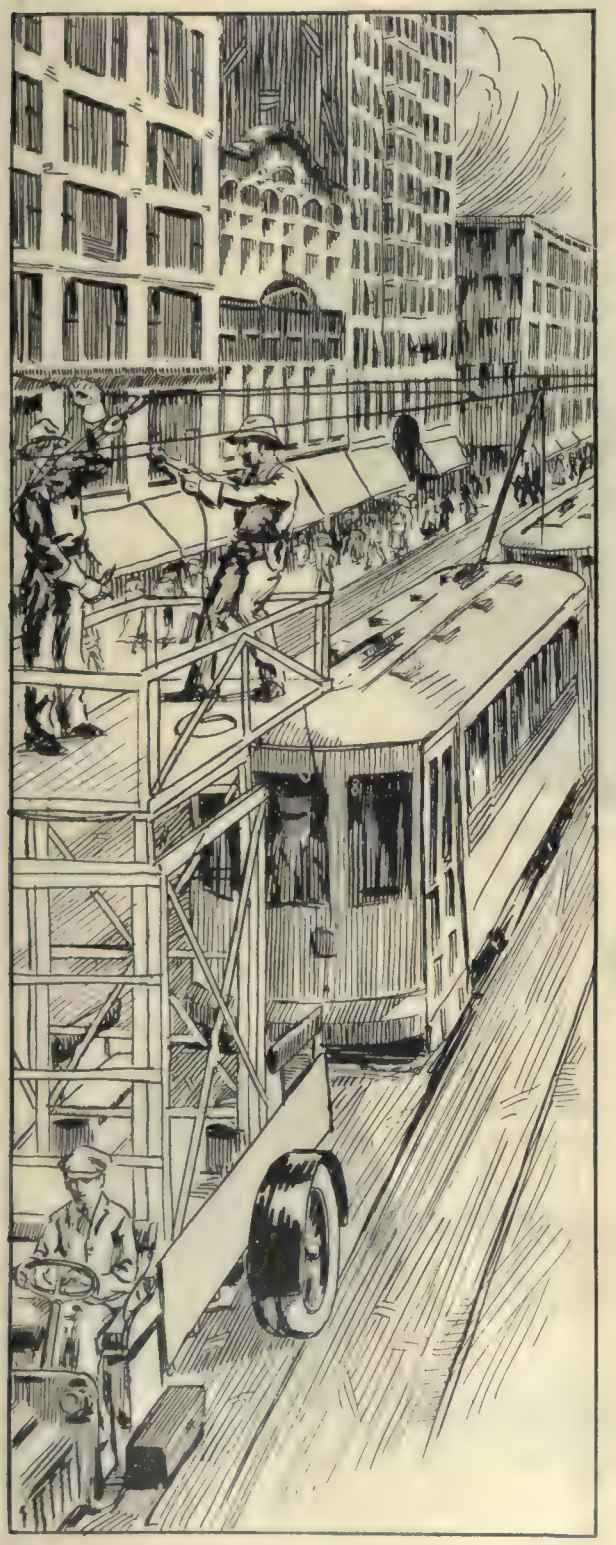


O-B TROLLEY CATCHER—
For City Service

The Ohio Brass Co.

Mansfield, Ohio

"Broken Trolley Wires Caused Delays Aggregating One-half Hour Per Day"



Just a quotation from a recent traffic survey.

Consider some of the implications in that statement!

Schedules disarranged.

Passengers disgruntled.

Thousands of car-miles wasted.

Hundreds of dollars lost in missed fares and extra platform time.

Phono-Electric never gives that kind of record

There's nothing uncertain or treacherous about Phono-Electric. Its tough, homogeneous structure not only assures long wear, but it also assures even, uniform wear. In Phono-Electric cities rush-hour breakdowns are out of the question.

BRIDGEPORT BRASS COMPANY

Bridgeport Connecticut

Tacoma and Seattle are Automotoneered Almost Completely

The Seattle & Rainier Valley Railway (formerly the Seattle, Renton & Southern Railway) is completely equipped —

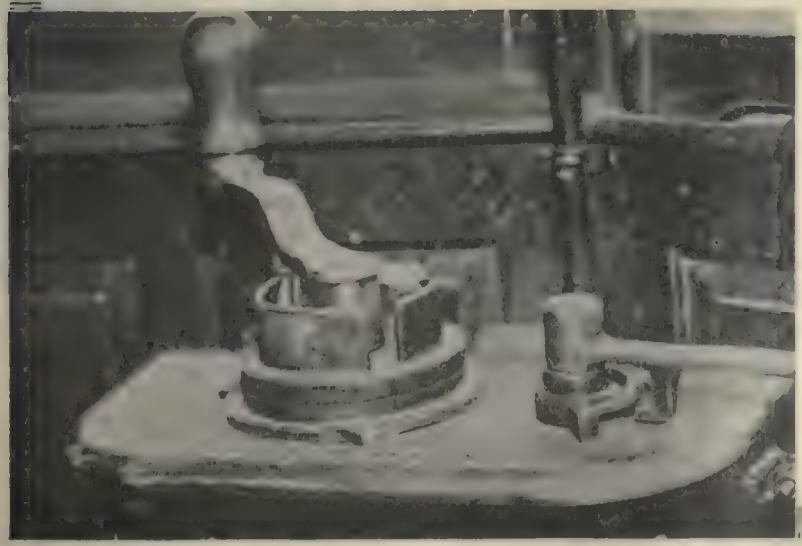
And the Puget Sound Traction, Light & Power Company is almost completely equipped with Automotoneers.





The simplicity of this device for curbing the careless motormen has resulted in its use on thousands of cars throughout the United States.

Why don't you use this means for cutting down your motor repairs and for the improvement of your car operation generally?



ELECTRIC SERVICE SUPPLIES CO.

MFR. OF

Railway and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

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Lyman Tube & Supply Co., Ltd.
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HARTMAN CENTERING CENTER PLATES AND PERRY ANTI-FRICTION SIDE BEARINGS



Run Your Wheels Further Between Turnings By Using These Bearings

Length of wheel life depends largely on the number of turnings or grindings they will stand. Worn flanges are caused by grinding against the rails. If you reduce the flange pressure you reduce wear, lengthen the time between "pull-ins" and decrease maintenance cost.

An anti-friction center plate does not decrease flange wear because it permits the truck to slap from side to side. An ordinary friction plate is worse because it binds the truck and prevents the wheels from running free.

The Hartman centering center plate is not anti-friction because it offers resistance to truck turning and tends to keep it straight. But the wheel flange pressure resulting *is never as great as that produced by a friction plate.* Moreover, on leaving a curve this centering bearing straightens the truck without pressure on the wheel flanges.

Consequently wheels on a Hartman-equipped truck last longer, the trucks do not nose and power consumption on curves is less. The bearings are not lubricated, and the balls, 2⅛ inches in diameter, do not pit the raceways and carry the load on two-thirds of their circumference.

These bearings can be placed on nearly any truck, new or old, and are not expensive. Send for new catalogue.



Put Them On Your *Old* Cars

Holden & White

Electric Railway Distributors for the Joliet Railway & Supply Co.

1508 Fisher Building, Chicago

U. S. Metal & Mfg. Co., New York and Washington; Grayson Railway Supply Company, St. Louis; C. F. Saenger & Co., Cleveland; Brown & Hall Supply Co., St. Louis; C. E. A. Carr, Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles; W. F. McKenney, Portland, Ore.



At "The Busiest Corner In New England" Foot-Traffic is Protected, Too

No pedestrian is splashed with muddy water when the switch points are shifted, at the corner of Summer and Washington Streets, in Boston.

The Boston Elevated officials knew that the characteristics of solenoid-controlled switches make for *splashy* operation in wet weather—they *also* knew that their relations with the public would be greatly *strengthened* by splash*less* switch movements at points of heavy *pedestrian* traffic—so they installed the "Collins"

Non-Splashing Electric Track Switch

—to the entire satisfaction of *everybody.* This highly efficient switch has still other advantages—here are a few of them:

The switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard ears; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

United States Electric Signal Company

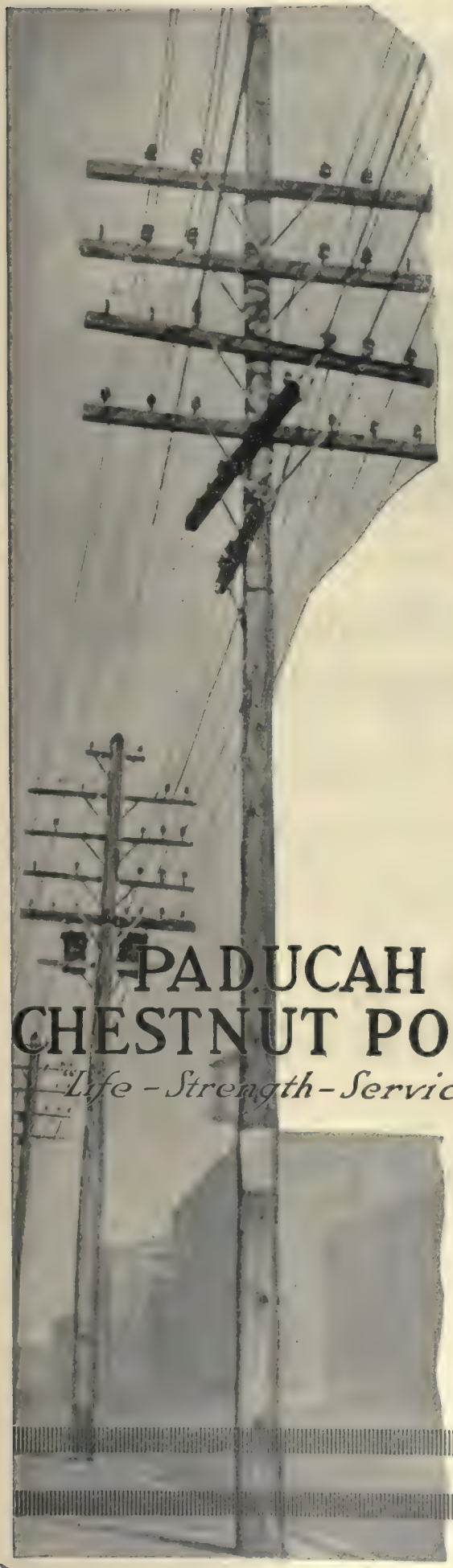
West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.



How Do You Buy Poles?

When you build a line, don't you figure on the qualities of wire? Don't you find out about qualities of insulators?

Don't you consider what that line has got to go through under the adverse conditions of heat and cold and wet and sleet and wind and storm?

Why don't you make some investigations and do some thinking about qualities of poles, the strength of poles, etc.?

Are not the poles the foundation and basis of the whole line? If the poles go down, you haven't much of a line left, have you?

The more you learn about poles the more certain you are going to specify and use Paducah Chestnut Poles.

Proof? All you want. Just ask for it.

PADUCAH CHESTNUT POLES

"Life - Strength - Service"

Paducah Pole & Timber Co.

John L. Fay, Sales Mgr.

408 City Nat'l Bank Bldg., Paducah, Ky.

Producers of Chestnut Poles, Cypress and Long-Leaf Yellow Pine Cross Arms, Piling, Bridge Timbers, Red Cedar Posts and Lumber

Yards: Paducah, Ky. Metropolis, Ill. Dividing Ridge, Ky. Bonnieville, Ky. Munfordville, Ky. Mansfield, Tenn.

407

Testimony from a Non-Partisan Authority

In Technologic Paper No. 62, dated March 10, 1916, the U. S. Bureau of Standards makes the following statement concerning the desirability and economy of track grinding.

"Continual pounding of a joint eventually develops a cup in the receiving rail, and rapid deterioration follows if the joint is not given proper attention."

"On newly bolted joints a difference in elevation of the abutting rails often exists, and unless filed or ground down to a perfect surface alignment will soon develop pounding and cupping."

"A number of companies now make a practice of running over all newly bolted joints with a track grinder and find that the slight expense is well justified by the increased smoothness and resulting longer life of the joints."



What is true of the effects of imperfect surface alignments at the joints is of course also true of such effects in any part of the rail, as is clearly shown by the bad conditions resulting from rail corrugation. That is why a

Reciprocating Track Grinder

is such an essential and economical part of the track department's equipment.

It insures new track against the early development of bad joints and it restores old track to good condition in the most economical way.

Railway Track-work Company

30th and Walnut Streets, Philadelphia





Columbia Bulldozing to Some Purpose!

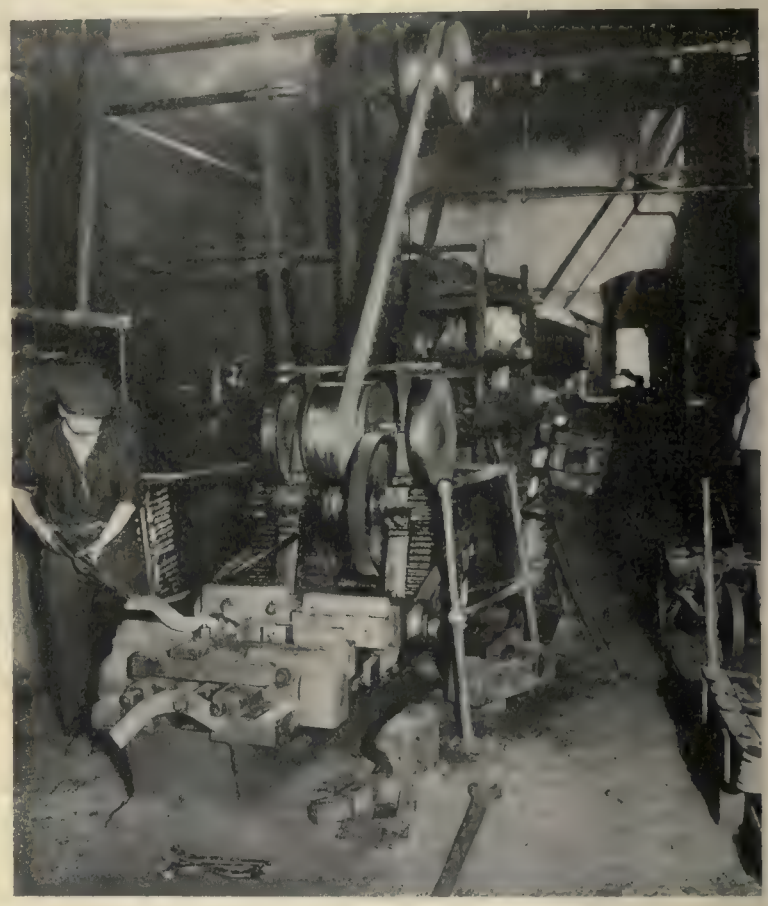
There are bulldozers and bulldozers. The kind shown deserves praise.

It's the machine we use for bending plates for brake lever jaws.

Like all the other Columbia tools, it's the best and most up-to-date for its work.

The large extent of Columbia business permits us to use highly specialized tools that are sure to do the work just as it ought to be done.

And this specialization in workers and tools is true of every item in the Columbia output.



Bulldozer Bending Plates for Brake Lever Jaws.

TOOLS

Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels





Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco



AT BOSTON

National Pneumatic Door and Step Control

Means Easier Handling of Articulated Cars

225 of the famous Lindall articulated cars of the Boston Elevated Railway are equipped with National Pneumatic Engines, Type O-M, 2⅝x10.

Through the use of these National Pneumatic Engines, one conductor can handle two cars with greater ease and smoothness than a single car with hand-operated mechanism.

Boston points the way to high-capacity units economically, safely and quickly operated.

Let us equip your big cars.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York — 515 Laflin St. Chicago



Pulling the Load

Down hill and on the level, a load moves easily; but up a grade it is a hard pull. You wouldn't try to move a load up hill with the brakes set. But that is the practice in many powerhouses. Any ordinary oil answers the purpose fairly well when the engines are running light, but when the load comes on and the pull is up hill, then every bearing should turn with the minimum of friction —you need the best oil you can buy.

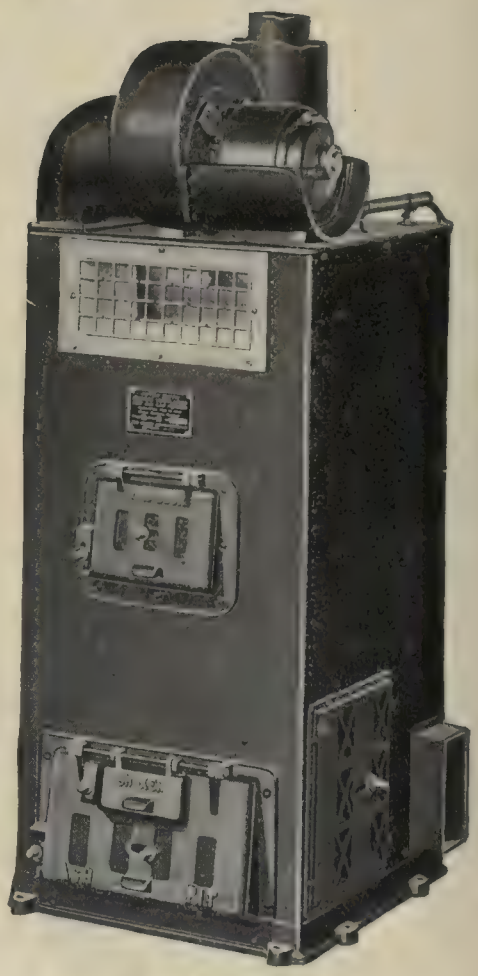
Specially compounded of the finest materials to meet the severest service, Galena Oils are unequalled for powerhouse lubrication. They are so exceptionally good that we stand back of them with a guarantee of service and cost.

Galena-Signal Oil Co.

Franklin, Pa.



PETER SMITH HEATERS



Encourage the Holiday Travel of St. Louis

When Winter holidays come, the temptation of your public to visit the art museum, the theater, the movies or some old friend can be increased to the point of *action* instead of *wishing* by offering them

Comfortably Heated Cars

The management of the United Railways of St. Louis knows what good car heating means in satisfying the riding public—and in getting the maximum travel on holidays as well as business days. That's why

1419 Peter Smith Hot-Air Forced Ventilation Heaters

are used at St. Louis on practically every car that the St. Louis lines operate. St. Louis summers are warm, but a wise management has provided for the inevitable days of winter.

Your use of Peter Smith Heaters throughout will also bring traffic-pulling car comfort at lowest cost.

PS HEATERS

The Peter Smith Heater Co.

Detroit, Mich.

Heater Specialists for Thirty-five Years

PS HEATERS

Bring Your Sales Story

to the direct attention of transportation men, electrical engineers, track engineers and superintendents of rolling stock, who influence the purchase of electric railway equipment for properties operating more than 48,000 miles of track and 100,000 cars through the

Annual Maintenance Number

March 17, 1917

Electric Railway Journal

239 West 39th Street

New York City

Member Audit Bureau of Circulations



So that your instructions may receive the most careful attention, make immediate reservations for space and copy service.

~~Cast Iron Wheels~~
~~Wrought Steel Wheels~~
Davis One-Wear Manganese Tread Steel Wheels

The Process of elimination— Apply it to the Wheel Problem

The three types to be considered are: Cast Iron Wheels, Wrought Steel Wheels and Davis One-Wear Manganese-Tread Steel Wheels.

One-wear cast iron wheels with hard chilled treads and flanges do not provide maximum safety and economy under heavy equipment. Iron must be replaced with steel to sustain the shocks and pounding.

Wrought steel wheels are known as multiple wear wheels and must be turned in a wheel lathe several times during their life to obtain their full mileage, because no effective method has ever been devised for hardening the tread and flange of a wrought steel wheel, which is made of ordinary carbon steel the same as must necessarily be used in the plate and hub.

Turning the tread and flange of wheels presents many problems. In the first place, it means a large investment in shops, lathes, tools and other equipment. It means employing additional machinists to man the lathes, and extra men for changing wheels. When wheels are removed for turning, the car must be switched into the shop and delayed for varying lengths of time. The partially worn brasses must be replaced with new ones instead of giving their full wear, which involves both labor and expense.

The reduced diameter of the steel wheel after being turned necessitates readjustment of brake levers and raising the body of the car to preserve proper motor clearances.

The consideration of strength and safety in heavy service eliminates the cast iron wheel.

Turning wheels to obtain their full mileage is subject to so many objections that it would be a great relief to eliminate this type of wheel, providing the last alternative offers a remedy.

The Davis Steel Wheel is many times stronger than the cast-iron wheel, and is fully as strong as the wrought steel wheel.

It makes its full mileage on one-wear without turning, which frequent tests have demonstrated is equivalent to the ultimate mileage of the wrought steel multiple-wear wheel.

It combines the advantages of the one-wear principle of the cast-iron wheel and the strength, safety and mileage of the wrought steel wheel, without being subject to any of the objections to either. It very materially reduces the weight of the cars.

Apply the process of elimination in solving the wheel question and adopt the Davis One-Wear Manganese Tread Steel Wheel for your standard.

American Steel Foundries

1100 McCORMICK BUILDING CHICAGO



OILLESS TROLLEY WHEEL AND NON-ARCING HARP

The use of the V-K Oilless Trolley Wheel results in practical economies impossible with any other types.

Time, labor and lubricant are saved because the patented bronze gauze and graphite brushing furnishes complete lubrication during the entire life of the wheel. The extra conductivity gained through the absence of oil or grease around the bearing saves current. The roofing of cars is spared the wear and tear of shopmen's feet engaged in inspection and oiling of wheels, and the harmful effects of dripping oil or grease.

These are exclusive V-K features—proved efficient in thousands of installations.

Send for illustrated catalog.

MORE-JONES BRASS & METAL CO.

ST. LOUIS, U. S. A.



1125 Rico Coasting Recorders Save Money for the Third Avenue Railroad, N.Y.

"Let's try the Rico Coasting Recorders on the hardest lines first," said the Third Avenue Railway System, New York.

So in 1910 the Company ordered only enough to equip the Forty-second street and Manhattanville division, in which is comprised one of the most congested parts of busy Forty-second street.

What did the Rico Coasting Recorder teach the motormen? To *coast* down to the standing vehicle ahead instead of stopping short suddenly.

Result: Less energy consumption, less air and shoes for braking, less run-down accidents; and an order for 1000 more Rico Recorders to equip the Third Avenue Railway System throughout.

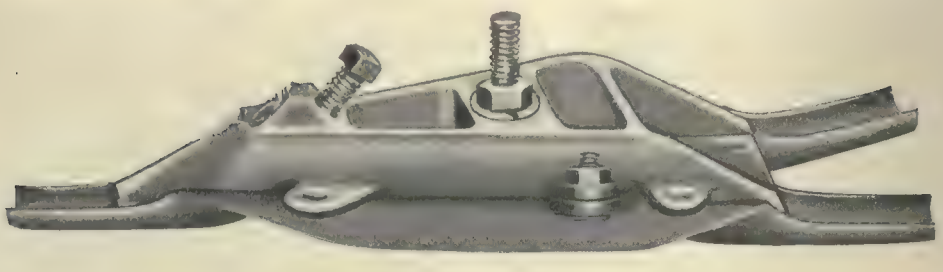


Four years' service on this division had given ample demonstration that the Rico Coasting Recorder embodies

The True Principle for Measuring Operating Efficiency

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK



A Light Weight Trolley Frog

Less than eight pounds is the weight of the G-E Form N trolley frog. It not only minimizes strain on the overhead construction, but owing to its removable pan is much more easily and quickly renewed.

The Form N Frog Saves Money—

The pan, only, need be bought and kept on hand as the sherardized iron body gets very little wear and will outlast many pans.

The Form N Frog Saves Time—

In making renewals simply bolt on a new pan without removing the frog from the wire. No pull-off wires need be disturbed. A worn pan can be replaced in two minutes.

Practical linemen appreciate the time and labor saving features of the G-E Form N frog and the lessened expense of maintenance is gratifying.

General Electric Company

General Office: Schenectady, N.Y.

ADDRESS NEAREST CITY

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*Southwest General Electric Company. †General Electric Company of Michigan.
For CANADIAN BUSINESS refer to Canadian General Electric Company, Ltd., Toronto, Ont.
GENERAL FOREIGN SALES OFFICES, Schenectady, N. Y.; 30 Church St., New York City; 83 Cannon St., London, E. C., England. 6770

Electric Railway Journal

Published by the McGraw Publishing Company Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLIX NEW YORK, SATURDAY, FEBRUARY 24, 1917 No. 8

RELIEVING THE RAILWAY OF THE PAVING BURDEN

Undoubtedly one of the most promising directions in which money can be directly saved for the purpose of improving service by electric railways is in obtaining release from the traditional paving burden with which they are saddled. Railways are looking for means of widening the margin between income and outgo. Here is a very tangible way in which it can be done, and it can be done because it ought to be done. The illogical character of the paving burden is indicated in an article by W. R. Dunham, Jr., in this issue, and we expect to publish other articles giving further proof of the truths which he convincingly sets forth. There is good reason to believe that the public through its public service commissions is coming to realize that this method of increasing the railway net has many points to recommend it. For one reason, it involves no changes in the rates of fare or in the transfer regulations, and for another reason it can be justified in equity, because it is hardly more logical to require repaving by electric railways than it would be to require them to light or police the streets on which they run. The public is reasonable in these matters when fully informed.

SCHEDULE SPEED A VITAL FACTOR

The plan of the Denver Tramway Company, as mentioned in last week's issue, to make an expert analysis of its schedules with the object of working out the most economical arrangement for each of its lines is significant. We are mentioning the plan not because the company in Denver is the first to adopt it but because we believe that scientific schedule making is at once the most neglected field as well as the one which is productive of greatest results on the average electric railway to-day. As has been shown in previous issues of the Electric Railway Journal, schedule speed has a more potent influence upon operating expenses than any other single item. In fact, under favorable circumstances a change in running time may even be reflected by an almost directly proportional change in the final cost of operation, wherein interest and depreciation charges on equipment, as well as working expenses, are considered. Yet it is not unusual to find a great deal of time and attention devoted to the saving of, say, 10 per cent in the cost of maintenance of equipment or track, or the expense of producing power—with the result that, at most, about 1 per cent, or 1.5 per cent or 2 per cent, respectively, of the operating expenses may be saved. At the same time the matter of schedule speed may be absolutely neglected, although a decrease of 10 per cent in running time on a property of reasonable size may bring about an equivalent saving that ranges from 4 per cent to 7 per cent of the operating expense because of the decreased platform costs and the decrease in the number of cars required to handle the traffic. In a word, the industry might better forget altogether the question of maintenance and power costs if, by so doing, it could concentrate effectively on the vital factor of schedule speed. That there is a field for such endeavors is evident from the fact that, although an average of 11 m.p.h. has been attained in a large city, speeds of less than 8 m.p.h. are almost the rule.

ADVERTISEMENTS IN "AERA"

We have never believed that the policy of the American Electric Railway Association in soliciting advertisements from manufacturers for publication in *Aera* was a proper one to pursue for several reasons, among them the following: (1) It puts a burden of expense for the maintenance of the association activities on the manufacturers over and above that which is borne by the railway companies, as both pay dues on the same basis. (2) This expenditure is largely to duplicate existing service and is unfair competition with technical papers. (3) The publication of a commercial magazine is a business activity as much out of harmony with the aims and spirit for which the association was founded as the manufacture of railway supplies, carbodies or machine parts. (4) A question of principle is involved. To this phase Colonel Williams and Mr. Tripp call special attention in their report presented to the executive committee at its Boston meeting. This report with the majority report on the subject is published elsewhere in this issue with the permission of President Storrs. Colonel Williams and Mr. Tripp say:

> "Even if no improper pressure has been or is brought to bear upon manufacturers and sellers of railroad apparatus in the solicitation of advertising, the very fact of such solicitation and the existence of such a medium, contributing as it does largely to the expense of the publication, cannot help being a potent but silent influence in compelling advertisements from those who otherwise would not seek or avail themselves of such an advertising medium. If we are right in this view, then the continuance of advertising involves not only a question of policy but a departure from that high standard of principle to which the association should adhere."

These are strong words and very much to the point, coming as they do from the head of a large metropolitan electric railway system, at one time himself an active newspaper man, and from the chief executive of a large manufacturing organization. Incidentally, Mr. Tripp, besides being in an especially good position to understand the advertiser's point of view, was the only rep-

resentative of the manufacturers on the committee and thus may be considered fairly to have represented their side of the industry. The report of the sub-committee has now laid the question before the membership at large. It is important for every member of the organization to appreciate clearly the practical and ethical aspects of the policy to the end that advertising shall be speedily eliminated.

GEARLESS EQUIPMENT FOR MOTOR CARS

From every standpoint the bi-polar gearless motor, such as is used on the New York Central locomotives, has been such an unqualified success during its ten years of operation that question may well be raised as to why it has not been applied to motor cars. Admittedly, the design has the vitally important feature of simplicity, and as we have previously pointed out, it may save more than enough through eliminated gear losses to pay for its higher first cost. Yet for motor cars the literally enormous weight of the magnetic circuit, which inevitably is extremely large in cross-section and long and clumsy in form because it must be built into the truck frame, absolutely prohibits its use for this service. In fact, several of the multiple-unit cars operated on the New York Central's electric zone were at one time provided with the bi-polar equipment as an experiment. As might be expected from the remarkable performance of the similarly-equipped locomotive they were eminently satisfactory from an operating and maintenance standpoint, but they necessitated the hauling around such an enormous excess of weight over the standard geared cars that the equipment had ultimately to be discarded and replaced with geared motors of the standard type. There seems to be, in consequence, no possibility that the gearless motor, notwithstanding its advantages of saving some 5 per cent in energy consumption and reducing maintenance, will ever come into use for motor car service.

DAYLIGHT SAVING BEFORE CONGRESS

Daylight saving, the plan of moving the clock ahead an hour in order to make our day correspond more closely to the hours of sunlight, is now being considered by both houses of Congress. It has the hearty support of President Wilson, and the Chamber of Commerce of the United States indorsed the plan at its recent annual meeting in Washington. The Daylight Saving Convention held in New York at the same time passed resolutions asking Congress to pass the bills. It therefore appears that daylight saving is in a fair way of being adopted by this country.

European countries last summer gave a practical demonstration of the plan. England, France, Germany, Austria, Italy, Holland, Denmark, Norway, Sweden and Portugal each set the clock ahead during the summer months, with the result that there was no confusion in the shifting of time, and the popular verdict was in favor of the change. There seems to be no doubt that the plan will be put into effect in Europe again next summer.

The issue of the ELECTRIC RAILWAY JOURNAL for June 16, 1916, on page 1118, called attention to some of the ways in which electric railways would be affected by the change of time. In many of them the effect would be beneficial. For example, the evening rush hour would come during daylight during many more days of the year than it now does. This would add to the public convenience and reduce the number of accidents. It would also be an advantage to railways that have a large lighting load, since the peaks of the railway load and the lighting load would not come together. All forms of recreation which require daylight would be greatly benefited, and there is no doubt the railways would receive increased travel in cars to and from baseball grounds and other places where outdoor sports take place. In the shops, of course, the change would also be beneficial in that it would substitute a cool morning work hour for a warm evening work hour, and the workmen after leaving the shop would have an extra hour of daylight to devote to recreation.

Since this plan has apparently worked out well in the ten European countries in which it has been tried, it is only reasonable to expect that it would be a success in the United States also. It is said that Canadian provinces are only waiting for the United States to take the lead in this change and that they will be glad to follow.

THE JOURNAL AS A CO-OPERATIVE INSTITUTION

We compared in these columns on Feb. 10 the service given by a technical newspaper and that by a public utility and found many points of resemblance. Each is in duty bound to tell its clientèle its main purposes and how it is striving to secure them. Each can be helped to give a better service when its public understands these purposes and approves them. With each the interests of the public are advanced as the service is improved and made more comprehensive. With this in mind we shall speak briefly of the JOURNAL as a co-operative institution.

One way in which the JOURNAL can help the industry is by inducing those who are giving their best thought to its improvement to express their ideas either through the editors or in signed communications and articles. Of the former we can naturally make no public enumeration, although we are glad to express here our sincere gratitude for the many helpful suggestions and active co-operation received continuously from the field. Of the signed communication there is, of course, a direct record, and a study of the lists of authors in recent volumes of the paper shows that the average number of names listed during each six months as authors of articles or communications or papers before societies is about 213. An analysis of the record of these articles published during 1916 shows that more than a sixth of them were by presidents, general managers and others in high managerial positions; more than a third were by engineers, master mechanics and others having to do with the physical property of the electric railway; slightly fewer than a third were by consulting and manufacturers' engineers, and others indirectly connected

with the electric railway field, while the rest were by railway men in positions other than those mentioned. To this large group of men should be added hundreds of others who have been willing to further the development of the industry by supplying information upon which articles have been prepared by members of the editorial staff.

In order that the JOURNAL may best meet the needs of its readers, their co-operation is necessary in the carrying out of its fourfold aim. This aim is somewhat as follows: 1. To supply promptly and accurately the news of the activities of the industry. 2. To point out the tendencies indicated by this news. 3. To publish articles on special topics when such are needed to assist in further developments. 4. To publish constructive comment on all developments in the industry so as to aid the electric railway man in the solution of the daily problems and to assist him in interpreting these problems to the public. The ELECTRIC RAILWAY JOURNAL is first and last a transportation paper, but it aims to cover also the allied technical fields in so far as they overlap that of transportation.

MORE ABOUT HANDLING WAY MATERIALS

The columns of this paper have been replete, during a few weeks past, with facts and opinions regarding the economical handling of way materials. From these it is clear that there is no one best way of performing this important operation. Many questions demand answers in every case, and the answers must differ with the local circumstances. Typical questions are these: Is extensive storage profitable? How much storage will combine the maximum of security and favorable terms buying with the minimum of handling, including local transportation? What machines are available for reducing labor cost, and which are most economical? Should storage be concentrated in one spot or on several sites? etc. The articles printed in this and previous issues indicate how the questions have been answered in a number of cases. This series would not be complete without some account of the latest large yard, that of the Cleveland Railway, of which Charles H. Clark has charge. Fortunately, it is now in shape so that a description is possible, and this is contained in an article elsewhere in this issue.

In the Cleveland storage yard somewhat different methods for handling and storing materials from those discussed in other recent articles on this subject are employed. A. E. Harvey of Kansas City, in his article in the issue for Jan. 27, emphasized the need of keeping the equipment in proper balance with the amount of work to be performed and pointed out the limitations of equipment that is useful for only a particular purpose and in one location. Further, he laid stress on the timing of the receipt of material so that it can be transferred directly to the job and thus need not be handled into and out of the storage yard. In the same issue, B. P. Legare of San Francisco stated that he had found several small storage yards to be preferable to one large one on his property.

In most yards the equipment for handling materials consists of many cheaply-constructed, permanently-located gin poles, stiff-leg derricks, etc., with very infrequent installations of the larger types of hoisting machines and traveling cranes. The Cleveland yard, however, is operated on such a large scale that many things are economically possible which would be sources of loss in less active yards. The immense gantry crane, for instance, represents such an investment that it must be kept in operation almost constantly in order to absorb the "overhead" profitably. Its area of operation along the 1000-ft. runway makes its use for handling various materials possible, as it covers a storage area 1000 ft. long by 120 ft. wide; that is, about 3 acres. With so large an area available, sand, gravel, coal, paving block, etc., are stored in the craneway, and the quantities involved are so great that the machine is kept at work almost constantly. So far as we are aware, this is the first time that the gantry crane has been adapted to electric railway work. If it proves as successful as it promises to do here, this type will constitute a serious rival to the overhead traveling crane.

Mr. Clark's aim in Cleveland has been to concentrate all stored way materials at the one location, and by this means he is able to justify large expenditures in handling equipment, and in turn realize considerable economies in loading and unloading cars. While as much material as possible is handled direct from the steam cars to the job where it is used, the quantities involved in the extension and rehabilitation work each summer in Cleveland are so great that the materials are used as fast as received or faster, and the storage serves promptly to supply the requirements in the intervals between shipments. The ample storage facilities also make it possible to take advantage of the better prices to be had when off-season delivery is permissible. Thus the price rather than the timing of delivery is considered the more important consideration in the purchase of materials.

Some of the general features of the Cleveland materials yard merit comment. For one thing it is equipped with new 80-lb. rail and new special work tamped and lined up in first-class condition for the severe usage under which it must bear up, and cars may be rather roughly handled without danger of derailment. This is in contrast to the not unusual use of partly worn-out rail and special work which leads to derailments and consequent delays. The absence of the overhead trolley has obviously great advantage in giving complete freedom of action to the various cranes. The improvised "third-rail" is, however, a makeshift arrangement which will probably prove to be so much of a nuisance that it will eventually give way to a real third-rail of the protected type and the equipment of the few necessary work cars and motor cars with third-rail shoes. The saving in the construction cost of the ground trolley over a third-rail, and the saving in a few contact shoes and cutout switches on the cars, less the cost of the hand poles, would not, we believe, offset the wasted time and unsatisfactory "fussing" with this makeshift arrangement.



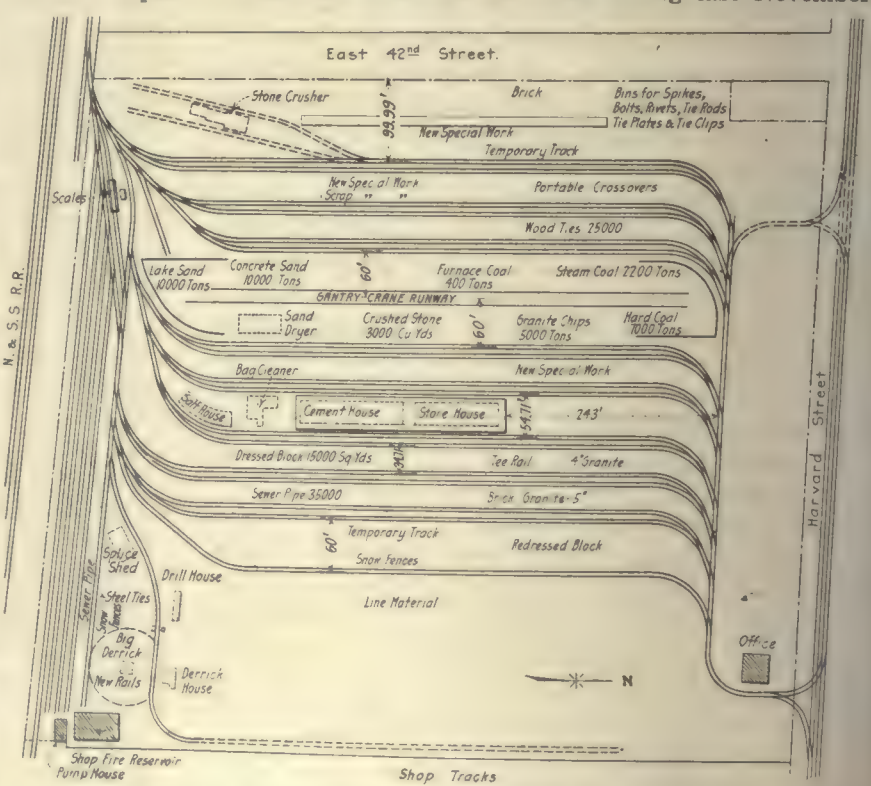
CLEVELAND STORAGE YARD—FIG. 1—STORAGE TRACKS AT BACK OF HARVARD YARD AND SCALE HOUSE AT LEFT

Layout and Equipment of Storage Yard for Handling Large Quantities of Way Materials

Charles H. Clark, Engineer Maintenance of Way Cleveland Railway, Has Developed New Schemes for Facilitating Economical Buying and Handling of Track Materials on a Scale Uncommon in Electric Railway Work

GREAT advantages accrue in city track construction work from the ability to have all materials delivered to the job in the amounts and at the times wanted. Also large economies are realized if suitable storage space is available by means of which it is possible to take advantage of the low prices which accompany large contracts and off-season deliveries, etc. These two considerations and a third, the advantages of concentrating the stores of the entire property very largely at one location, governed the layout and equipment of the 19-acre materials storeyard of the Cleveland Railway now nearing completion. It was planned by Charles H. Clark, engineer maintenance of way, and is called the Harvard storage yard. Its location is adjacent to the company's new Harvard Avenue shops on the eastern outskirts of the city.

By concentrating the storage of the principal way materials for the whole company at this new yard it has been possible profitably to invest in handling facilities of size and design quite unfamiliar in electric railway storage yards. But when it is considered that the Cleveland Railway had occasion last summer to handle in and out of its storage yards 14,335 tons of 5-in. and 4-in. paving block, 25,987 yd. of old Medina paving block which was redressed and sent out again for new use, 18,000 wooden ties, great quantities of sand and gravel, cement, special work, etc., and then the 13,600 tons of coal which is in storage and being handled this winter, the economy of large investments in equipment can be readily seen.



CLEVELAND STORAGE YARD—FIG. 2—GENERAL PLAN OF YARD

On Jan. 26, the company had 71,196 bags of cement in stock and was taking all that it could get under a contract made last year at a price more than 20 per cent below the present market. This is one of the advantages of having facilities for the storage of 100,000 bags, as are provided at the Harvard yard. A good idea of the general quantity of materials handled at the yard is also had from the fact that during last November ninety-two cars of sand, gravel, granite block, cement, etc., were received and 312 cars were received in one month last summer, while the average year-round monthly receipt of materials is 250 cars.

The location of a yard to handle such quantities of materials was an extremely important consideration, balancing as it must the real estate value against trans-

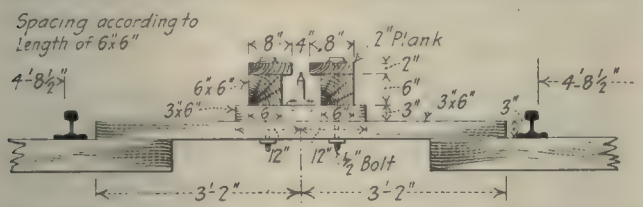


CLEVELAND STORAGE YARD—FIG. 3—GROUND TROLLEY WIRE CONSTRUCTION



CLEVELAND STORAGE YARD—FIG. 5—CRANE CAR WITH GROUND TROLLEY CONTACT POLE

portation facilities and convenience of distribution to various points in the city. The property comprises 19 acres on the eastern outskirts of the city, located on a comparatively new crosstown line which gives rather direct access to various parts of the city. Physical connection with the Newburg & South Shore Railroad, a



CLEVELAND STORAGE YARD—FIG. 4—DRAWING SHOWING DETAILS OF GROUND TROLLEY CONTACT SCHEME

belt line controlled by the American Steel & Wire Company, and connecting with all roads entering Cleveland, gives suitable transportation facilities.

Leading from the steam line is a ladder track which serves four car-storage tracks in the yard. The Newburg Railroad sets the cars in on these tracks (Fig. 1) and from here they are moved by electric power to the unloading point in the yard. The overhead trolley is continued out of the yard and over the siding of the Newburg Railroad along the back of the yard so that the company may set empties out there for return. A 100-ton-capacity Howe scale with house and pit electrically heated, is located at the yard entrance on a track adjacent to the ladder track.

The general yard location adjacent to the company's shops is also a matter of importance on the Cleveland property, as it provides a convenient and economical means of storing and handling the large quantities of coal required for use in the hot-air heaters with which all Cleveland cars are equipped, and for the shop heating plant.

The general layout of the material yard is shown in the accompanying drawing, Fig. 2. Nineteen tracks, laid down in pairs, with 35-ft. to 60-ft. spaces between adjacent track centers for storage purposes, buildings, etc., cover the yard area, the two tracks between material, aisles giving simultaneously access to the materials on either side. Materials are assigned to these spaces tentatively as shown on the plan. All tracks are laid on well-ballasted wood ties with new 80-lb. T-rail and high-grade special work.

One of the special features of the yard is the absence of the overhead trolley which has been done away with by using an improvised third-rail (Figs. 3 and 4). Only



CLEVELAND STORAGE YARD—FIG. 6—CONCRETE TROLLEY POLE, YARD LIGHTING UNIT AND EXTRA TROLLEY HAND POLE; FIG. 7—GENERAL VIEW FROM OFFICE BUILDING ALONG FRONT LADDER TRACK



CLEVELAND STORAGE YARD—FIG. 8—GANTRY CRANE OF LARGE CAPACITY



CLEVELAND STORAGE YARD—FIG. 9—PAVING BLOCK IN STOCK ALONG GANTRY CRANE RUNWAY

two tracks through the yard, tracks 7 and 10, which are to be used for the principal through movement, are equipped with the overhead trolley. The balance of the yard is clear of poles and wire to give free use of the various cranes. This ingenious third-rail consists of a No. 000 trolley wire fastened with standard ears on regular barn hangers set inverted on 3-in. x 6-in. x 24-in. blocks. These are mounted on 3-in. x 6-in. x 6-ft. 4-in. timbers resting on the tie ends between adjacent tracks, and each trolley serves both tracks of the pair. Protection from accidental contact with the trolley wire is afforded by paralleling it with 6-in. x 6-in. stringers on top of which 2-in. planks are fastened. These leave a 4-in. opening through which to make contact by moving the cars.

The method of making contact is also rather novel (Fig. 5). A long hollow pole equipped with a standard harp and trolley wheel at one end and a hook at the other, with a cable through the pole connecting the two, is placed on the trolley wire and hooked over the trolley wheel when the car is moved. If the trolley pole is tied down to the side of the car, the hand pole connecting with the ground trolley wire will guide itself. Ordinarily an attendant walks along on the top of the plank protection and holds the contact pole on the wire. The overhead trolley when completed will extend over the main tracks and around the curve into the storage tracks and be dead-ended on an I-beam supported over the pair of tracks by two steel poles. The ground trolley wire will continue through the yard from these points. Each section of ground trolley wire may be cut off by a knife switch mounted in a box on a pole near the end of the section when there is to be no call for use of this track during a period of time, thus eliminating danger of accident completely. Extra trolley hand poles are hung on the overhead poles at various points of the yard (Fig. 6) so that there is always one available close at hand.

By all means the most striking feature of the Cleveland yard is the huge gantry crane (Figs. 7, 8 and 9) for loading and unloading coal, sand, gravel, etc., and even special work—anything that can be picked up with the clamshell bucket or a magnet. Its capacity is indicated by the fact that it carries a 30-ton counterweight. The cantilever truss is 62½ ft. long from the outer end to the center of rotation and is capable of turning a complete revolution. The legs have a 16-ft. spread both ways. The crane is mounted on eight 30-in. wheels, and a runway 1000 ft. long is constructed across the yard. Each rail is carried on a 2-ft. x 8-ft. concrete bed reinforced with old rail. The 8-in. x 8-in. ties are set into the concrete level with the top and the rail fastened to them with bridge clamps and lag screws.

The crane was built by the Variety Iron Works, Cleveland, and is equipped with four 33-hp. and one 7-hp. Westinghouse 600-volt motors, and a Lakewood Engineering Company 2-yd. clamshell bucket. Its use has introduced great savings in the handling of almost all materials in the yard. The handling of paving block has been found to be considerably speeded up by loading





CLEVELAND STORAGE YARD—FIG. 10—CEMENT AND STOCK HOUSE; FIG. 11—PILING SACKS TWENTY-FIVE HIGH IN CEMENT HOUSE



CLEVELAND STORAGE YARD—FIG. 12—STOREROOM FOR SMALL HARDWARE AND TOOLS

the bucket by hand from the car or pile and dumping where desired. This saves one handling, for, when done manually, it is necessary to throw the blocks back after throwing them off the car in order to keep them off the track. The same double handling would be necessary in loading cars for distribution in the city.

The cost of unloading a car of granite with the gantry crane, using one operator and five men on the car, is $3.16, while the cost of manual unloading, using a foreman and twelve laborers, is $4.09. The latter figure does not include the labor cost for throwing the blocks back away from the tracks. Using a derrick and five men, besides the operator, the cost is about the same as with the gantry crane. The gantry crane will unload a gondola of slack coal in twenty minutes, or a carload of wet gravel in forty minutes.



CLEVELAND STORAGE YARD—FIG. 13—SALT HOUSE BUILT ON A CURVE

Other materials-handling facilities in the yard include a 5-ton derrick car (Fig. 5) with a 26-ft. boom, and a 15-ton locomotive crane with a 50-ft. boom about to be ordered. All machines are, of course, electrically operated from the 600-volt trolley supply.



CLEVELAND STORAGE YARD—FIG. 14—OFFICE BUILDING AT ENTRANCE TO YARD

The principal storage building in the yard is the cement and general storage house (Fig. 10). This is a building 250 ft. long by 50 ft. wide, divided into five sections by fire walls. Three sections are devoted to cement storage and two to the storage of hardware, tools, and various materials which need to be sheltered from the elements. The building is constructed of concrete with concrete floor and roof and a large skylight in each section. The floors are designed to carry the extra heavy load of cement sacks piled twenty-five sacks high, as seen in Fig. 11. One of the general storerooms is equipped with steel cabinets and shelving (Fig. 12). Rolling steel firedoors close the openings between sections and those leading out onto the loading platforms. Two Buda elevating-platform, storage-battery trucks of 4000-lb. capacity are later to be installed in the cement house, and it is expected that each one of these will make possible the handling of ten sacks a minute, piling them twenty-five sacks high.

The salt house (Fig. 13) is also an all-concrete building, and is built on a curve to conform to the track curvature at that point. Between this and the cement house, a cement sack cleaner will later be erected. This will be practically identical with the one on the Cleveland property described in the ELECTRIC RAILWAY JOURNAL for Oct. 9, 1915, page 772. Other buildings and machines to be rapidly installed in the yard are a sand dryer, a stone crusher, a splice shed, a drill house, and a a long storage bin for track bolts, rivets, tie rods, tie plates, tie clips, etc., extending along one entire side of the yard, as seen on the plan.



CLEVELAND STORAGE YARD—FIG. 15—CIRCUIT BREAKER AND KNIFE SWITCH MOUNTED IN BOX ON POLE

A brick office building (Fig. 14) on the Harvard Avenue side of the yard and at the main entrance is very finely finished and equipped for the use of the yard superintendent, clerical help and laborers. The three offices for the superintendent, bookkeeper and timekeeper are on the second floor and one large room on the first floor is furnished with steel lockers, and with steel tables and benches for the men to use at lunch time. A large washroom is adjacent to this. The building is heated with a Peerless automatic gas heater and hot water is supplied by a Hoffman automatic heater. A large Klaxon horn mounted in the center of the yard and operated from a button in the office provides a ready means of calling the men into the office when wanted.

The yard is to be lighted from the 600-volt trolley supply with 500-watt nitrogen-filled lamps, connected five in series. Twenty of these lamps (Fig. 6) are now installed and more will be put up as the yard is completed. These are mounted on special steel brackets on the trolley poles, and placed high above the top of the pole in order to distribute the light over a wide area. A circuit breaker is provided in the cutout box for each circuit (Fig. 15) in order to prevent the burning of the knife switch.

Advertising Policy of "Aera" Discussed

Reports "Pro" and "Con" Were Considered at Last Week's Meeting of Executive Committee of Association—Three Members of Sub-Committee Appointed to Consider Question Are in Favor of Present Plan—Two Members Oppose Advertising on Principle and as Unfair to Private Initiative

AT the meeting of the executive committee of the American Electric Railway Association held in Boston just prior to the mid-year meeting on Feb. 16 one of the subjects considered by the committee was the continuation of advertising in *Aera*, the association magazine. Ever since the inauguration of the enterprise criticism has been expressed against the solicitation of advertisements for the magazine. This has come in part from the manufacturers themselves, in part from the publishers of technical publications in the field which looked upon the inauguration of a commercial magazine by the association as unfair competition, and partly from officials of railway companies who objected to the plan on principle. In view of this feeling the executive committee passed the following resolution at its meeting on Dec. 20, 1916:

> Whereas, it is the sense of this committee that there is a serious question of principle involved in the publication of advertising matter in *Aera*, and it is the opinion of the committee that the publication of the magazine is of great value to the association, it is, therefore
>
> Resolved, that a sub-committee of the executive committee be appointed by the president to investigate the entire matter and report by Feb. 8 for presentation to a meeting of this committee to be called in Boston, Feb. 15.

The following sub-committee was then appointed to present a report on the subject at the meeting of the executive committee in Boston:

Arthur W. Brady, president Union Traction Company of Indiana, Anderson, Ind., chairman.

John J. Stanley, president Cleveland Railway.

C. Loomis Allen, Allen & Peck, Inc., Syracuse, N. Y.

Timothy S. Williams, president Brooklyn Rapid Transit Company.

Guy E. Tripp, chairman board of directors, Westinghouse Electric & Manufacturing Company.

A DIVIDED REPORT

The report of this committee was presented at the meeting of the executive committee on Feb. 15 in Boston and consisted of a majority and a minority report. The reports of both the majority and minority members of the committee are published below. In view of the fact that the majority favored the continuation of the soliciting of advertising from manufacturers, the executive committee, after discussion, decided to continue that policy for the present in *Aera*.

MAJORITY REPORT

Your sub-committee, appointed pursuant to your resolution adopted Dec. 20, 1916, to investigate and report upon certain matters connected with *Aera*, submits its report as follows:

The publication of *Aera* was begun in August, 1912. Advertising has always been carried except for the period April to December, 1913, during which time an arrangement with the Manufacturers' Association for a contribution in lieu of advertising revenue was in effect. An advertising solicitor has been employed beginning with January, 1914.

The revenues and expenses of *Aera* have been as follows:

For the fiscal year ended Sept. 30 or Oct. 31	Revenues	Expenses	Deficit
1912 (2 months)	$1,832.46	$2,087.57	$255.11
1913 (12 months)	4,561.07	11,550.88	6,989.81
1914 (12 months)	13,305.16	16,779.44	3,474.28
1915 (13 months)	11,813.62	20,757.46	8,943.84
1916 (12 months)	17,728.71	21,742.91	4,014.20
Total	$49,241.02	$72,918.26	$23,677.24

In the revenues stated appear receipts from advertising as follows:

1912	$1,730.90
1913	4,532.74
1914	12,970.00
1915	11,497.10
1916	17,543.24
	$48,273.88

Nothing is included in the revenues stated on account of the subscriptions of members. The circulation of *Aera* among members of various classes is about 5000, and the revenues at $2 per subscription from such members for the fiscal year ending Oct. 31, 1916, was $9,653.70, which, if included in revenues, would have converted the deficit of $4,014.20 for that year into a surplus of $5,639.50.

It is apparent from these figures that the revenue of *Aera* from advertising during the magazine's history of four years and three months to and including October, 1916, was a matter of considerable consequence, and that without it the loss from the publication would have constituted a heavy burden on the treasury of the association. It may reasonably be expected that the same statement will hold good for the future also.

The financial aspect of the matter is thus put forward not because it is controlling, for your sub-committee does not so regard it, but that the problem presented may be fully realized. It may be taken for granted that the association is unable to continue the publication of *Aera* if so doing will entail an annual loss, based on the 1916 figures, of almost $18,000, in addition to a deficit of about $4,000, making a total of $22,000. If advertising be eliminated, the consequent loss of revenue must be made up from other sources, such as an increase of dues, which is probably out of the question, or must be met by a radical reduction in publication expense through a decrease in size and curtailment in scope of the periodical. The problem presented is therefore of a two-fold nature involving on the one hand the continuance of the present advertising policy of *Aera* and on the other the continuance of the present policy of the publication with respect to the scope and size.

Addressing itself to the first phase of the problem, your sub-committee believes that *Aera* is an advertising medium of value. The circulation of the magazine among the various classes of members of the association is about 5000, and a large share of these subscribers are connected with electric railway companies in positions of responsibility. Among these subscribers is a considerable proportion of those who determine or in a few years will determine the kind of apparatus, appliances and supplies which their companies shall purchase. No reason occurs to your sub-committee for questioning the

value of *Aera* as a means of bringing such articles to the attention of those men.

Assuming, then, that *Aera* offers a field for profitable advertising, the question arises whether the Association shall permit that field to be occupied and derive a revenue therefrom? Thus far that question has been answered in the affirmative, but the decision thus made is criticised on various grounds.

1—The question is asked whether the appearance of advertising in *Aera* is consistent with the dignity of the association. Your sub-committee does not believe that there is a shadow of reason for criticism on this score. Proper advertising properly displayed, is as fit for the pages of the magazine of the association as it is for the pages of any privately owned magazine, popular or technical.

2—Objection is made that the influence of the association and its members is unfairly exercised to induce manufacturers and dealers in supplies to insert their advertisements in *Aera*. This, it should be noted, is an objection to the method of securing advertising patronage and not to the fact that advertising is taken at all. The objection is, however, most serious, and, if well based and the policy of carrying advertisements could not be thoroughly purged of unfairness of method in securing those advertisements, the policy itself should be abandoned. Very little has been brought to the attention of the committee in support of this objection, and if instances furnishing reason for criticism have occurred, it is believed that they are exceptional and due to an excess of zeal rather than an intention to exert undue influence over any individual or company. Your sub-committee believes, nevertheless, that since this criticism has been made in apparent good faith, positive instructions should be issued, in case the present advertising policy is continued, that the taking of advertising in *Aera* shall be submitted to possible advertisers wholly on the merits of the publication as an advertising medium, and that in particular nothing shall be said or done by any officer or employee of the association to induce the belief that a failure to advertise in *Aera* will be regarded as an exhibition of unfriendliness to the association or the industry which it represents.

3—The objection is made that *Aera* is in the nature of a "jitney"—that is, that *Aera* is an unregulated competitor of the existing electric railway technical press and operated without regard to the economic principles which must govern the operation of a privately owned publication. Closely akin to this objection is another—that the field open to occupancy of the electric railway technical press is so narrow that the present policy of *Aera*, both with regard to advertising and scope, cannot be maintained without seriously hampering the usefulness of the privately owned electric railway publications. These objections combined, present a grave question. Your sub-committee does not, however, believe that *Aera* has been operated on the "jitney" principle. The annual deficits have been recognized and have been paid out of the association treasury in the belief that the association received full value therefor. The duplication of over-lapping by *Aera* of subjects with which the technical press deals does not appear to be serious. The table of matter appearing in *Aera* for the thirteen months October, 1914, to October, 1915, contained in the report of the *Aera* Advisory Committee made in September, 1916, does not seem to have been controverted and may be treated as substantially applicable to subsequent periods. That table shows that out of 1526.75 pages of *Aera*, excluding advertising pages, 68.58 per cent were used for association affairs, question-box and formal matters, and 31.42 per cent, or 478 pages in all, were used for operating questions (including engineering, traffic, transportation, and accounting), public relations and relations with employees. As it is only the latter class of matter which it might be claimed encroached on the publication field of the technical press and as *Aera* is only a monthly magazine of ordinary size page, the question of duplication does not seem to your sub-committee one of consequence.

The freedom of *Aera* from just complaint in these particulars does not, however, determine whether there is a lack of room for both *Aera*, with its present advertising and editorial policies, and other electric railway publications. Your sub-committee realizes the great value to the electric railway industry of such technical journals as the ELECTRIC RAILWAY JOURNAL and the *Electric Traction*. If convinced that the continuance of the present policies of *Aera* would substantially impair the usefulness or growth of those publications, your sub-committee would not hesitate to recommend such a change in those policies as would meet the situation. We cannot, however, conclude on the basis of our present information, that the present *Aera* policies will have the effect referred to. This statement is made after a careful reading of the various briefs, letters, reports and discussions of *Aera* policies which constitute a part of the association's records of the past year.

Your sub-committee believes, for the reasons stated, that no change in the advertising policy of *Aera* is desirable, and so recommends.

The resolution creating your sub-committees perhaps contemplates a report upon the question whether, regardless of advertising policy, a change in the editorial policy of *Aera* is desirable. The only concrete suggestion made is that *Aera* shall be merely a bulletin, confined strictly to association matters and the question-box. Sixty-four pages are stated as the proper size, and the cost of printing and mailing, exclusive of editorial and other supervisory and incidental expense, is given as $6,000 a year. It is interesting to note in this connection that the table in the report of the *Aera* Advisory Committee already referred to shows an average of eighty-three pages per month taken up by association affairs, question-box and formal matters. The space so occupied may be expected normally to grow.

Your sub-committee believes that *Aera* in its present form is a valuable means of arousing and sustaining interest in Association work, thereby, materially benefiting the electric railway industry, and does not recommend any change in the general policy of the publication.

Respectfully submitted,

JOHN J. STANLEY,
C. LOOMIS ALLEN,
ARTHUR W. BRADY (Chairman).

MINORITY REPORT REGARDING "AERA"

The undersigned members of the sub-committee, while believing strongly in the usefulness of an association publication and recognizing the value of *Aera* to the members of the association, cannot subscribe to the recommendations of the above report in respect to the propriety and desirability of a continuance of the policy of soliciting or accepting advertising for such a publication. We believe that in permitting such advertising the association's publication is encroaching upon a legitimate field of technical journalism under private enterprise, and that inasmuch as this field is concededly limited in scope and opportunity for profit, the advertising competition of *Aera* is unfair to those whose private initiative has been, and can be, of great service to the electric railway industry. Moreover, even if no improper pressure has been, or is, brought to bear upon manufacturers and sellers of railroad apparatus in the solicitation of advertising, the very fact of such solicitation and the existence of such a medium, contributing

as it does largely to the expense of the publication, cannot help being a potent but silent influence in compelling advertisements from those who otherwise would not seek or avail themselves of such an advertising medium. If we are right in this view, then the continuance of advertising involves not only a question of policy but a departure from that high standard of principle to which the association should adhere.

Conceding as we do the necessity of an association publication, we believe that its contents should be confined to reading matter only upon subjects dealing with the association's affairs and reports, and should assume the character of a bulletin rather than that of an electric railway journal.

Respectfully submitted,

Timothy S. Williams,
Guy E. Tripp.

Feb. 14, 1917.

Highway Paving by Street Railways

The Paving Burden Laid Upon Electric Railways by Municipalities Is Both Unreasonable and Inequitable

By W. R. DUNHAM, Jr.
Engineer of Maintenance of Way The Connecticut Company, New Haven, Conn.

THE function of a street railway is to provide transportation for the public at a reasonable rate. This implies a reciprocal obligation between the two parties, the public and the company. The company must provide a reasonably adequate service for which the public must provide a reasonable return, which should include all the cost with a fair profit on the capital invested.

Building of Pavement Is a Municipality Function

It is no function of a street railway company to build streets or pavements for the use of the general public, except under mutual agreement in consideration for locations first granted. The building of pavements is a function of the municipality, or of all the people. In the early days of urban transportation by street railways the motive power was by horse and, although the railway relieved the pavement of wheel wear by running on its own special pavement in the shape of rails, this relief confined the wear of the pavement by the locomotive power to narrow strips along the rails due to the tracking of horses. As this was an added burden or wear confined to a small area, it was fair and just that the company causing it should be compelled to care for it. The condition was recognized in Connecticut and elsewhere by the statutes governing the operation of railways. The statute in this state specifically provides for repairs to pavements within certain limits, being the area between the rails and 2 ft. on the outer sides of the outer rails.

That the statute did not contemplate placing the burden of constructing new pavements on the companies is shown by its wording. It states that repairs only are contemplated, and further, that the highways are maintained by law by the various municipalities. It also limits these authorities to ordering the repairs made with the same class of pavement as that with which the highway is paved, with one exception, which will be referred to later. There is no statute covering the renewal in its entirety of all the pavement on what is defined as the railway area, and it is doubtful if a municipality can compel a company to renew the entire pavement within the limits above described under the statute.

The exception as to class of pavement noted above refers to a strip of pavement 1 ft. wide on each side of each rail. Bearing in mind that at the time the statute was passed the cars were hauled by horses, and that the normal tracking of these horses was close to the rails, the necessity for a harder paving material on both sides of each rail is apparent. Most pavements were of earth or macadam, rapidly worn out by the continued action of the horses' hoofs. It is obvious, then, that this provision was in the nature of a protection, not only to the authorities who were "bound by law to maintain such highway," but also to the company which was bound to keep in repair a certain part of it. This exception permitted a compound pavement, on that part of the highway occupied by the tracks, of a character more resistant to the abrasion of the horses' hoofs. A cobble or block type of stone was permitted along the rails for the footing of the horses, with a pavement between of a character similar to that of the highway as a whole, and so suitable for the vehicular traffic ordinarily to be found on the highway.

"Repairs" Is An Elastic Term

Of late years this statute has been used under a false interpretation of the word "repairs" by the various municipalities, to provide more expensive pavements for all the people at the expense of the railways, a result not intended at the time the statute was passed. This is entirely unreasonable at the present time since, with the general use of electricity for the operation of cars, the wear on the pavement by this railway travel is removed and the life of the pavement is increased, as more people are accommodated by fewer vehicles.

The cost of new pavements thrown onto the companies in this State is enormous, the area defined by the statute to be kept in repair by them being from 33 1/3 per cent to 60 per cent of the total area of the highway. In money cost it means from $300,000 to $400,000 per year, a large sum to be diverted from the proper uses of a company. This, since it brings in no return, must be paid for by diminishing the real accessories of a railway. That is the municipalities are not getting the pavements free of cost, but must pay for them in lessened facilities; as by fewer cars, inadequate power, or some form of poorer service, unless they wish to provide the necessary funds by increased rates of fare.

Effects of Snow Removal and Vehicle Parking on Pavement Maintenance

There is a feature of unreasonableness even in the question of repairs to pavement by railways. During the winter months the companies must, in order to operate, keep their tracks clear of snow and ice. As this cleared area is frequently the only passable part of the

highway, all vehicular traffic is confined to it. By law this area must be kept in repair by the company, and yet it is subjected to 20 per cent more wear from use by the general public than the remaining area of the highway, since it is passable and free from snow. On the principal streets also, due to the necessary parking of vehicles next to the curb, 75 per cent of the wear is on the area defined by the statute as subject to repair by the company.

As commonly understood and interpreted, therefore, the paving statute referred to is a most unreasonable one. Its intent should be clarified so that the people as a whole may be informed of the fact that they would be better served if this pavement money was spent for service instead of surface.

A railway company, having installed its tracks and replaced the pavement in the condition in which it was found should not be called on for anything more than such repairs as are due to the presence of its structures in the highway. It should not be expected to renew the pavement in its entirety, unless this is made necessary by the entire renewal of the tracks. If for public improvement it is necessary or desirable to renew the pavement, the public should pay its entire cost. This renewal of pavement often necessitates the entire renewal of the company's tracks, although they may have ten or twenty years of life, and the sacrifice of this life is an economic waste which in the end must be paid for by the public.

The majority of people who depend on the cars for daily transportation should be vitally interested in this matter, as in the end they are the ones most affected adversely. While they are entitled to good pavements they are more entitled to good and reasonable service, and they should insist that the part of the public which does not use the railway, but which utilizes other modes of transit more deleterious to the pavement, should pay for the damage which they cause. The car users should not sit back supinely and pay each year by poorer service for this maintenance, while their neighbors who can adopt more expensive means of transportation cut their costs of maintaining the pavements which their methods of transportation make necessary.

"Repairs" Versus "Renewals"

I want to reiterate the fact that repairs and not renewals of pavements were intended by the legislators at the time the several statutes were passed, as the wording is always "repairs." The statutes in this state were enacted in 1863, revised in 1888 and again in 1893, but in each revision the word "repairs" is used. In these years the modern expensive pavements were not in use, except on the most important streets, but even on these streets the pavement costs were not as high as now. Again, in many instances, the fare was 6 cents and length of ride for the fare was much less than it is at present.

Assuredly, then, no law-making body would intentionally place upon a utility a future burden such as the present misinterpretation of the statutes assume. Neither would they provide free roadbeds for all other modes of transportation at the expense of one, especially when the one relieves the pavement of the wear which the others impose upon it. One car moving on its special track can carry the load of ten trucks, thus relieving the roadway of both congestion and wear, and yet the ten trucks pay practically nothing toward even maintaining the pavements they destroy. By the misinterpretation of the statutes the car must pay not only for the maintenance of the roadway, but for its entire renewal at the whim of municipal authorities. This affords an advantage to its competitors at no expense to them and requires a company to pay for something that is of no use to it, but rather a positive detriment since it increases the cost of any repairs or renewals which may become necessary to its own roadway, that is, its tracks.

The Railway's Paving Responsibility

It is, of course, conceded that repairs to the pavement caused by the structures of the company must be paid for by the company. This is fair since it applies to all other occupants of the highway; but that repairs can be construed to mean entire renewal cannot be conceded, for it is neither equitable nor just.

To assume that this paving burden is of the nature of a franchise tax is erroneous, for at least two reasons. It is not equitable to either the municipalities or the companies since the poorer towns, not being able to finance new pavements, get no help except state aid on trunk lines, while the prosperous communities overburden the companies and so get a tax out of all proportion to the value of the franchise. This tax is not assessed at a fair valuation, but rises and falls with the desires for new pavements. In some instances it requires the practical rehabilitation of an entire system in a year or two, thus throwing an unreasonable burden on the earnings of a company, a burden which by any just method of taxation should be spread over a term of years.

Pavement Should Be Chosen to Suit Track

Another feature in the paving question lies in the character of the pavement to be laid on streets in which there are tracks. The type of pavement to be decided on should be chosen for its adaptability to the track and of a kind most durable in combination with it. Once a street is paved it is desirable that the use of that street be as uninterrupted as possible. Hence a type of pavement which will adapt itself best to the rails should be selected, and the rail should be selected not for the pavement but rather for the peculiar highway traffic which it is to carry. In other words, the present form of procedure should be changed by first selecting the most suitable rail, considered as a rail rather than as a part of the roadway, and then getting a type of pavement best suited to fit this rail. In this way the best all-round results will be obtained, the most permanent construction and least disturbance of roadbed will result, and repairs will be reduced to a minimum, not only in the track itself but in the pavement also.

As stated at the outset, the function of a street railway is to sell transportation, not to build pavements. In performing this function it should repair the damage caused by its use of the highway but not renew pavements worn out by the use of others. It should furnish equipment for its patrons but not roadways for its competitors. And it should be allowed to give a fair return on the investment necessary for the proper carrying on of its one and only function.

Interstate Railways' Accident Record

According to the Quarterly Accident Bulletin of the Interstate Commerce Commission for April, May and June, 1916, 446 persons were recorded as having been killed and 4574 injured on interstate electric railways during those months. Out of 3414 persons, the nature of whose injuries were recorded, 1911 persons were passengers on passenger trains, one person was a passenger on another train, four persons were carried under contract, 459 were employees on duty, three persons were employees not on duty, 103 were trespassers and 983 were other persons not trespassers. Recorded damages from collisions and derailments amounted to 62,649 in 1915 as compared with 131,558 in 1914 and 211,777 in 1913.

Wage Arbitration and Contracts*

Public Is Interested in Uninterrupted Service Under Labor Contracts Arising with New Economic Thought—Arbitration Not Being Satisfactory, Public Supervision of Relationship Between Employer and Employee Seems Desirable—Question of Using Commissions for This Work Deserves Serious Study

By BENTLEY W. WARREN
Boston, Mass.

EXCEPT in isolated instances, public regulation has entirely neglected the relations between the carriers and the army of human agents through whom the carriers conduct their public service and for whose individual action the carriers are by law made responsible. Even in the few exceptional cases, as in limiting the hours of employment or in requiring the use of various safety devices, the regulation is usually due to considerations, actual or alleged, of public safety and not, as in the case of the regulation of financial activities of the carriers, to considerations affecting the cost of the service.

Regulation of Utility Labor Has Not Been Thought Necessary

Doubtless the lack of governmental attention in the past to this important feature of transportation has been due to the belief that it was unnecessary. It was assumed that the self-interest of the utility managers, who represent the investors and seek to insure a return to them upon their investment, would result in the selection of the most competent employees available and at the lowest wages which would be acceptable in an open labor market. It may have been supposed that the ordinary operation of the economic law of supply and demand would prevent any undue or avoidable burden upon the public in the form of wages or other concessions to the employees. This economic law is still to some extent operative in many lines of industry. Wages are seen to rise and sometimes, though with decreasing frequency, to fall under changed industrial conditions. To the same extent this condition might be true in the case of carriers, if the public had no more interest in transportation service than it has in the product of an ordinary mercantile or manufacturing establishment.

In cases of the latter kind the public can usually await with equanimity the settlement of a wage dispute between capital and labor. Even in such cases, however, the public interest cannot and, as shown in the coal strike of thirteen years ago, will not wait if the dispute becomes country-wide and affects a prime necessity of life. This condition always exists in the case of all street railway transportation conflicts. The controversy does not need to be country-wide or state-wide; to the public of the particular community served by the particular carrier the conflict, if permitted to reach the stage of an interruption of service, is as disastrous as a country-wide interruption might be to the country as a whole.

Public Sanctions Collective Bargaining But Demands Uninterrupted Service

With the recognition of the reasonableness of collective bargaining every controversy between a carrier and its employees involves not merely a possibility, but almost a certainty, of an interruption of service if it remains unadjusted. Collective bargaining implies collective quitting of work. There is no collective labor body to take the place of the collective body which suddenly quits work. Consequently, if the controversy is not adjusted and the employees withdraw in a body the public service must necessarily be interrupted. Ultimately the places of the employees might be filled by equally or even more competent men and at the same or even lower wages, and under working conditions which might insure to the public better service for the money which they pay through the agency of the carrier to those men. In the public estimation, however, these considerations seldom weigh against the inconvenience of partial, irregular and uncertain service during the interval of adjustment.

Not only does the more recent economic judgment of the public sanction collective bargaining; it also, to a considerable extent, approves, if not actively supports, efforts to better the conditions of the workingman and to relate his wages to a higher standard of life than mere subsistence. It is noticeable of late years to what an extent the question "What can a man be hired for?" has been relegated to the background, and in its place has been substituted the question, "How much ought this man receive to insure to himself and his family a decent and reasonably comfortable existence?" Probably the adoption of these changed views is desirable, and their general acceptance will conduce to the advantage of the community. They terminate, however, as far as public service corporations are concerned, the old standards of individual employment. The managers of such corporations must recognize these new views, and in the main have done so.

Labor Contracts and Interests of Parties Therein

Both the carriers and their employees have become conscious of the difficulties which the adoption of new economic opinions has produced. They have sought to minimize these difficulties by so-called contracts between the carrier and the body of its employees, the latter usually acting as members of a union through selected officers or representatives.

Whenever such a contract is to be negotiated, the employees' chief interest is in the wages to be paid, the working conditions under which their labor is to be performed and the security of their positions. In the development which has taken place in the negotiation of such contracts, and the concessions which have already been obtained by labor, the employees' interest to-day is, more specifically, in securing direct wage increases and various indirect increases through modifications of the working conditions.

The carriers' interest, like that of the employees', is in wages, but to keep them stationary; in the working conditions, but to prevent their use to secure indirect increases in wages or, which amounts to the same thing as far as the treasury is concerned, in increased cost of operation; in the maintenance of discipline, and in the freedom of transportation service from interruption.

*Abstract of paper presented before the American Electric Railway Association mid-year convention at Boston, Mass., on Feb. 16, 1917.

The public is interested in the quality and extent of the transportation service, which is largely dependent upon the character and skill of the employees; in the freedom of that service from interruption, which again is almost entirely dependent on the character and conduct of the employees and upon their refraining from resort to a collective withdrawal from service; in the cost of that service, which each year is becoming increasingly dependent upon the wages of the employees, and in the safety with which the service is conducted, which again is dependent upon the character and skill of the employees, upon their working conditions being not unduly burdensome, and upon the efficiency of their discipline.

What Labor Contracts Should Insure

Such contracts should be definite and clear in their terms. They should insure adequate and proper service for the public; adequate and certain compensation for the employees; safety of operation, which necessarily involves and assumes a power of discipline in the management's control; and freedom from interruption, which necessarily involves prohibition of wholesale discharge of employees by the company and of strikes by the employees.

Labor contracts, to secure the results to which the public is entitled, should absolutely prohibit strikes under any circumstances during the term of the contract, and should similarly prohibit reductions by a carrier in wages or changes in any other terms of the contract agreed to by the carrier. They should provide that all discipline should be retained in the hands of the management. The writer has seen few contracts which contained a prohibition upon strikes, and has known of cases where such a prohibition was suggested by a carrier and its insertion was refused by the employees. While some earlier contracts did retain in the management the control of discipline, many if not most of the more recent contracts provide for the arbitration of all grievances, including those arising in the attempted exercise of discipline. There have been several instances of strikes during the continuance of a labor contract, and perhaps the most frequent cause of such strike has been a grievance arising from a carrier's attempt to enforce its discipline, although the carrier would arbitrate the justice of the penalty imposed.

Arbitration Is Not Entirely Satisfactory

Both the carriers and their employees are conscious of the increasing difficulties which beset their attempts to negotiate and carry out satisfactory contracts. Both are also conscious of the interest in such contracts of the unrepresented public, and especially of the interest of that public in the uninterrupted regularity of the service. Notwithstanding this recognition of the difficulty, they have never been able to agree upon a method to admit the representatives of the public to their negotiations, or to delegate either to the courts or any other constituted public authority the final decision in matters upon which the carrier and its employees fail to agree.

The solution usually attempted is settlement through three arbitrators, one selected by the carrier, one by the employees and the third by those two. While no one would say that this method does not represent a commendable effort to save the public from an interruption of service, it is probably true that no representative either of a carrier or of its employees, who has had experience with such arbitrations, would say that the method is satisfactory. It is difficult to settle the questions to be arbitrated, to select the third arbitrator and to educate this practical judge up to his work. Always an unreasonable amount of time is consumed, and great expense is incurred under the present method of arbitration.

Giving the Public a Share in the Settlement

So far as the writer is aware, the public has never been officially represented even at the formal hearings in a street railway arbitration. The awards of such arbitrations have no binding effect upon the public or the representatives of the public who are charged with the regulation of rates. Such public officials are at liberty entirely to ignore the effect upon the carrier of an increase of wages awarded by an arbitration board. The courts not only can, but must, ignore the reinstatement by such a board of an unskillful and incompetent employee. In the one case the company is compelled to pay the increased wages with no right to secure increased income with which to do so; in the other the company is compelled to pay in damages for the results of the incompetence and lack of skill of an employees whose employment it could not prevent.

It would seem that any well-considered scheme for supervision and regulation of street railways should cover the relation between the carriers and their employees. If public supervision of this relationship is desirable, the public tribunal to be used—it would first occur to a student of the question—would be the same tribunal as that already entrusted with the supervision in other respects of such carriers. That there would be certain and very great advantages in such a selection is obvious. The existing supervising bodies, by the very nature of their present duties, are familiar with the general subject of transportation, with the financial condition and ability of the companies, and with the peculiar requirements of the service. They, therefore, could easily determine the effect both upon revenues and upon service of any proposed changes in the relations between carriers and employees.

As an appellate body with final authority to deal with the vexatious and frequent questions of individual or collective grievances and discipline, a commission could exercise that authority intelligently and with due regard to the safety and efficiency of operation in each case. Responsible as such a commission is for promoting the safety of the public, the carrier would be justified in accepting the decision of this body that a given employee ought to be reinstated as conclusive evidence that the carrier's managers had been wrong in discharging or otherwise disciplining such employee. The innumerable controversies over details, the unreasonable delays and the great expense involved in the present system of arbitration would disappear. Either the carrier or the employees could take any disputed matter at once to an authoritative tribunal and could expect a speedy, definite and final determination.

Whether the time has not come for appropriate legislation to vest the public service commissions with jurisdiction over the relations between the carriers and their employees is a question deserving most serious consideration and study. The question is so large and has been so recently raised that I am not prepared at this time to express a definite opinion. I believe, however, that it is bound in the near future to require an answer. It is significant that the Public Service Commission for the First District of New York has already advanced tentative suggestions looking to such an extension of its powers. Those suggestions, in my opinion, merit careful study.

During the year 1916 on the interurban lines of the Detroit (Mich.) United Railway 277,807 orders were issued by train dispatchers. This was an increase of 50,248 over the number issued in 1915.

Practical Results in Publicity Campaigns

Three Cases in Which Crooked Politicians Were Outwitted by the Railway Managers

By CHARLES T. HEASLIP
New York City

[In the first case the mayor of a certain city, in an effort to control the labor vote, promised co-operation in a proposed strike. Exact information, put before the public frankly, checkmated him. In another case the manager "called the bluff" of a labor-dominated mayor during a strike crisis. These sentences epitomize the third case: Politician—"You know we're not in politics for our health." General manager—"Neither am I running a sanitarium for grafters—now get out before I throw you out," and then the G. M. gave the public some information regarding the type of men who were in office.]

IN the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 27, 1917, page 153, two examples were cited to show how the unscrupulous or misguided "reformer" could be and had been circumvented. These examples involved the use of public speaking for the purpose of neutralizing the tirades of the "reformers." It is not when the reformer or politician foe takes the stump against a corporation, however, that he is most dangerous. He is at least out in the open then, and if the company meets him there and presents its case promptly, honestly and fully the public will usually return a fair verdict. It is when he quietly injects himself into the labor troubles that arise ever and anon in the public utility field that he becomes a real menace—even to the most honestly conducted corporation. Organized labor is quick to take advantage of political support, and when both the unions and the politicians are lined up against a company it has to have a wonderful reputation for fair dealing in the community which it serves if it is to come out unscathed.

An incident illustrative of this fact occurred about two years ago in a town which boasts one of the best managed street railway companies in the country. This company was giving good service and stood high in the estimation of the community. It paid good wages and treated its employees fairly. Under such circumstances it may be difficult to understand why its general manager should have found himself confronted one day with labor trouble among his trainmen. Such things do happen, however, and will continue to happen until the best brains in the ranks of capital and labor get together and devise some fair method of settling disputes without either side bringing in "advisers" from the outside.

The troubles of this particular company were brought to it from the outside. The state in which it operated was upset generally by industrial strife at the time, and an organizer from one of the national trainmen's unions took advantage of the general state of unrest to organize a "local" among the conductors and motormen. The general manager made no move to block the organization of the "local," and about 60 per cent of his men joined it. But when the inevitable list of demands was presented to him a week later, he called a meeting of all his trainmen, both union and non-union, and gave them a heart-to-heart talk. He called attention to the fact that he and all the other company officials had always been willing to meet with them, either individually or in a body when differences arose, and that all past differences had been settled satisfactorily. He added that it was the company's intention to continue this policy, but that it was also its intention to maintain an "open shop."

"Therefore," he said in conclusion, "if you men will get together as a whole and appoint a committee that will be fairly representative of all of you, both union and non-union, I shall be glad to meet that committee and make whatever adjustments are fair to both sides."

It is probable that this offer would have been accepted by the men if the union organizer had not approached the mayor and urged him to use what influence he had to force the company to recognize the newly-formed union. He called the mayor's attention to the strength of the labor vote and intimated that any favor he could do for the "street car boys" would be appreciated by all the voters in the ranks of organized labor.

The proposition pleased the mayor, but he was too crafty a politician to come out openly against the company. He compromised by addressing a secret meeting of the "local," and promised the men that if they forced an issue by calling a strike he would see that no police protection would be given to the company's property. He also promised to frame up some emergency legislation that would prevent the company from using any strike-breakers.

The general manager of the street railway corporation was a man of more than ordinary ability in handling delicate situations. He did not approve of a street railway or any other large employer of labor carrying its difficulties with its employees before the public, as publicity in such cases only tends to rouse a factional spirit and to make the issues more difficult of settlement. But when he learned that the mayor's support was being taken seriously by the men, and that there was talk of calling a strike on the approaching Fourth of July unless the company recognized the union, he decided to force the issue at once. He knew that he and his company had the respect of the community and that it would give him a fair hearing on any subject which involved both the company and the public. So he bought a full page of advertising space in each of the local newspapers. Here he announced that some of his conductors and motormen were talking of going out on a strike on Independence Day, and as traffic was usually heavy on holidays the company thought the people ought to know about this so they could arrange their plans accordingly.

This announcement was supplemented by a brief and truthful review of the events leading up to it (excluding the part which the mayor had played), and also by a statement of the company's side of the case. In conclusion the general manager stated that his company stood ready to make any fair adjustment of the differences that had arisen between it and its dissatisfied employees and trusted the public would be spared the inconveniences of a strike.

This advertisement threw both the agitators and the mayor into a panic, and the latter's panic increased

when the general manager visited him and told him quietly that unless he ceased meddling with the private problems of the company, another advertisement would be published which would deal exclusively with the part the city's chief executive was playing in encouraging a situation that might result in riot and disorder. The newspapers and the chamber of commerce then took up the matter and, by indorsing the original plan of settlement submitted to the men by the general manager, showed the union that it could expect little public support if the agitators persisted in forcing a strike. The mayor, meanwhile, seeing which way the "cat was jumping," promptly came out for "law and order."

The upshot of the matter was that inside of forty-eight hours the more level-headed of the union men got together and voted down the strike idea. A few days later the general manager's offer of mediation was accepted and all differences were satisfactorily adjusted.

A Case in Which Cordial Public Relations Helped Out

Sometimes in an effort to secure or keep the labor vote, politicians will attempt even cruder tactics than have just been outlined. If, however, the head of the corporation that is being menaced is sure of his company's standing in the community he can sometimes outwit them. The following is an instance.

Several years ago a street railway strike was in progress in a coast city where the mayor was completely dominated by the labor agitators. He called the general manager of the traction company over to the city hall on the day the strike started and warned him that if he attempted to put strike-breakers on the cars the chief of police would be ordered to have them shot down on sight.

The general manager, who was an Irishman, wet his lips and pushed back his coat sleeves nervously when this ultimatum was delivered to him. Then, controlling both fists and brogue with an effort, he turned to the mayor and spoke as follows:

"Is thot so? Well, thin, you'd better tell your chief and his min to have their insurances paid up, because my cars are goin' to run to-morrow with stroike-breakers on thim—and they're goin' to have guns—and they're goin' to shoot those guns at the first copper who raises a gun to thim. If you want civil war here you're goin' to get it!"

But there was no civil warfare the following day. The mayor was not a good poker player.

Outwitting the "Grafter"

Another rôle which public utility men have discovered the crooked politician is prone to adopt is that of "grafter."

Nearly any idea for an ordinance that will tend to embarrass a company or cause it to spend large sums of money on so-called "improvements" or "extensions" that are not really needed can be used by him as a lever to extract some graft from the corporation affected if its officials are at all cowardly.

In the old days, before the corporations learned that the public did not want to stand for a crooked politician any more than it did for a crooked corporation, it was easier for the grafter to terrorize the public utilities than it is to-day. This is shown by the following illustration.

Seven years ago the "collector" for the mayor of a city of 40,000 population went to the general manager of the local street railway and showed him the advance copy of an ordinance which, if passed, would compel him to rebuild the company's double-track loop in the heart of the city at an expense of about $20,000.

"It will cost you $5,000 to prevent that ordinance from getting over," said the collector, bluntly.

The general manager, who was a good lawyer as well as an operator, read the proposed measure carefully and then shook his head.

"Nothing doing," he said. "Our franchise rights have precedence over that ordinance."

"All right," said his visitor cheerfully, "then we'll attack the validity of your franchise."

They did this so effectively that the company had to spend $25,000 and fight in the courts for three years to protect its stockholders from the depredations of a crooked mayor and a thieving council.

The general manager did not ask for the co-operation of the public in that fight, nor did he attempt to "show up" the politicians who were behind it. He did not figure that it would do any good. Last year, however, when another effort was made to coerce him into crossing the palms of some political grafters he tried an experiment. He dealt the public a hand in the game.

The chairman of the highway commission in a town through which his principal interurban line ran had approached him with an offer of a private right-of-way through the main street of the town "for $5,000." Now, the general manager did not want such a private right-of-way, and, moreover, even if he had wanted it the highway commission did not have the power to grant it. Property owners along the line could have blocked it by injunction proceedings. He called this to the attention of his visitor, who was also political "boss" of the town, and the latter admitted that this might be true. But he insisted that he and "the boys" needed $5,000 anyway.

"You know we're not in politics for our health," he added.

"Neither am I running a sanitarium for grafters," said the general manager. "Now get out before I throw you out!"

The chairman got out, muttering threats of revenge, and the following week the council of his town passed an ordinance compelling the railway company to stop its "limited" cars at all crossings within the town limits instead of at only one street as before.

The general manager decided then that an opportune time had come to let the citizens of that town know the type of men they had voted into public office. As a special favor to the town he had instituted, the year before, an "owl car" service between it and the city in which his local lines operated. This had become very popular, especially with the theater-going inhabitants. Knowing that a public clamor would be raised if this service was abandoned, and appreciating the opportunity which such a move would give him to expose the grafters, he seized it and announced that the "owl car" service would be discontinued until the town council saw fit to revoke the ordinance which had upset the "limited" service on the interurban line.

This was an effective counter blow and resulted disastrously for the grafters, for in the investigation that followed other petty acts of the town's political crooks were uncovered and a general house-cleaning followed.

Cartoon Series of Editorial Talks

The Electric Railway Journal has republished in pamphlet form the cartoon series of editorial talks, twelve in number, published in this paper from Oct. 7, 1916, to Dec. 23, 1916, inclusive. Copies of this reprint will be sent to any subscriber upon application as long as they last. The set was reprinted because of the interest expressed in these cartoons and the desire of a number of readers to have a complete set in convenient form.

American Association News

Plan for Affiliated Association for Manufacturers Presented at Boston—Signal and Claims-Transportation Committees Held Profitable Meetings This Month—Records of Two Recent Company Section Meetings Are Given

Status of Manufacturers

Report of the Sub-Committee on the Subject Was Presented at Boston

The report of the sub-committee of the executive committee of the American Association, appointed by President L. S. Storrs on Dec. 20, 1916, was presented to the executive committee at Boston. It recommended the organization of an affiliated association which would have five representatives on the executive committee and would take full charge of the exhibits and have such other duties as might be assigned to it by the president and executive committee. The sub-committee also recommended that representatives of manufacturers be appointed to membership on the committees of the parent and affiliated associations in the same way that railway men are now appointed. The committee consisted of Guy E. Tripp, E. W. Rice, Jr., S. M. Curwen, Thomas Finigan and James H. McGraw, chairman.

At the meeting of the executive committee of the American Association on Feb. 15, as mentioned in the issue of last week, it was decided to refer the report back to the sub-committee with recommendations of the executive committee for further consideration.

Joint Committee Discusses Block Signals

A meeting of the joint committee on block signals was held in the William Penn Hotel, Pittsburgh, Pa., on Feb. 2 to receive reports of the various sub-committees appointed at the Newark meeting. The members of the committee present were J. M. Waldron, New York City, chairman; J. W. Brown, Newark, N. J., co-chairman; J. B. Stewart, Jr., Youngstown, Ohio, J. J. Brennan, Fort Wayne, Ind., G. K. Jeffries, Indianapolis, Ind., R. C. Johnson, Brooklyn, N. Y., and John Leisenring, Peoria, Ill. The visitors present by invitation, representing various signal manufacturers, were: R. V. Collins, West Newton, Mass., S. M. Day, Rochester, N. Y., H. W. Griffin, New York City, and L. F. Howard and Earl Saunders of Swissvale, Pa.

The subject of standards was first discussed. With regard to automatic block signals for high-speed interurban service, investigations showed that the principal objection that had been raised to the requisites as outlined in the 1916 report was in the improper wording of the first requisite. At present the wording is: "Signals of prescribed form, indications given being in not more than three positions, by lights of prescribed color or by both." The sub-committee was advised to submit informally a revision of this requisite to the standards committee and ascertain if possible how any further objections could be met. With a view of harmonizing standards common to steam and electric railways, it was intended to make the revised wording conform to those formulated by the American Railway Association and the Railway Signal Association.

On the subject of the use of continuous track circuits for control of signals for high-speed service, it was decided that the standard as now contained in the Engineering Manual be eliminated and the matter be covered by requisites of installation. The addition of explanatory notes to the requisite was recommended for the help of members of the association not familiar with terms used in signaling.

Considerable discussion was given to the subject of block signal operation on roads signaled from end to end, this investigation covering maintenance costs, efficiency and effect of traffic. It was thought that the phrase "from end to end" limited the number of roads affording data, and the committee decided to use data obtained from roads using block signals over parts of their routes to show possible results for the case of a road signaled throughout its entire length.

The subject of the operation of trolley contact type of signals will be considered further by the sub-committee. Forms for aspects were submitted and tentatively adopted which are similar to those used with track circuit light signals excepting the cautionary indication. A note was added stating that, when used exclusively on single track, a single yellow light will indicate that a car is in the block proceeding in the same direction. Where car-spacing signals are used, two yellow lights will indicate that the next signal is at danger. Where both track circuit and trolley contactors are used, both red and yellow lights will be used to indicate caution. The sub-committee will submit copies of the proposed aspects to all manufacturers of trolley contact signals.

It was recommended that the work of referring to the Railway Signal Association plates showing apparatus applicable to electric railways be continued but that these should not include specifications for transformers until definite specifications have been decided upon. It was thought that reference to the plates should be made with caution especially in the cases of apparatus the design of which is not yet standard.

Progress on other assignments was reported and the chairman appointed another sub-committee to investigate the co-ordinate work of previous committees according to topics.

It was decided to hold the next meeting in Chicago on March 19.

Joint Committee on Claims-Transportation

Co-operation between claims and transportation departments in reporting accidents and in preventing them was the topic discussed at the meeting of the committee held in New York City on Feb. 1, 1917. The meeting was attended by H. A. Bullock, Brooklyn, N. Y., chairman; H. D. Briggs, Newark, N. J.; A. G. Jack, Chester, Pa., and E. L. Lindemuth, Wilkes-Barre, Pa. In view of the similarity of subjects assigned to this committee and those under study by the electric railway section of the National Safety Council, and of the fact that many railways belong to both associations, it was decided to work in conjunction with the safety education and safe practices committees of the N. S. C. electric railway section. The ways in which this will be done are as follows:

An attempt will be made to get railways to make slides and motion picture films available to members in accordance with the plan discussed at the N. S. C. Detroit meeting, but only American Association members not in the N. S. C. will be approached. Messrs. Lindemuth and Jack were appointed a sub-committee to pre

pare a report on safety education methods, with respect to expense and conditions under which typical methods had proved successful. For this work the material collected by the N. S. C. will be available. The chairman stated that the safe practices committee of the N. S. C. electric railway section is working out a plan of safety organization adapted to various conditions, namely to roads having union or non-union employees, willing to make liberal or only limited expenditure, etc. The joint committee believed that this would be appropriate as an appendix to its 1917 report.

The committee agreed that all information obtained by claims departments, excepting names and status of witnesses outside of the companies' employ, should be turned over to the transportation departments, and that names be furnished if desired in special cases when this can be done without prejudicing the companies' cases in court.

Messrs. Bullock and Briggs were appointed as a subcommittee to work out a set of inter-department forms to be used in carrying out this plan.

Capital Traction Company Section

The meeting of Section No. 8, held on Feb. 8, was addressed by Elon Von Culin, superintendent of traffic. He spoke of the work of the transportation and traffic departments, covering schedule building, traffic studies, and causes and prevention of delays in service. Some charts and tables were used to illustrate the talk after which followed a general discussion. Several members of the Washington Railway & Electric Company Section were guests, some of whom also gave short talks. Entertainment for the evening consisted of several vocal and instrumental selections. The number of members and guests present was 114.

Milwaukee Section Meeting

The regular meeting of the Milwaukee Company Section was held on Feb. 8. L. G. Riley of the Westinghouse Electric & Manufacturing Company addressed the meeting on "The Latest Development in Electric Car Control." He used slides to illustrate various details and reviewed the different types of car control which preceded the present multiple-unit system as installed on the Milwaukee company's new center-entrance cars. Following the talk by Mr. Riley the company section orchestra rendered several selections, after which the much-talked-of moving picture "King of the Rails" was shown. About 250 were in attendance.

The usual review of the technical press, dated Feb. 8, 1917, has been sent out to members of the section.

Preparedness Poster

The conference committee on national preparedness, of which Henry A. Wise Wood is chairman, has prepared a poster giving statistics of the army and navy with a statement of the needs of the country in both of these directions. The poster is 27 in. x 42 in. and has been issued to educate the public on the needs of national defense. Copies will be sent without charge to any electric railway company which wishes to display these posters in its waiting rooms. The conference committee may be addressed at 32 East Forty-second Street, New York.

For a number of years past the Fishkill Electric Railway has followed successfully the practice of giving $3 a month bonus to every platform man who shows a clean slate as regards obedience to the rules.

COMMUNICATIONS

Suggestion on Truck Standards

CHICAGO ELEVATED RAILWAYS

CHICAGO, ILL., Feb. 8, 1917.

To the Editors:

I have been greatly interested in reading the article entitled "Truck Classification," by Mr. S. A. Bullock, which appeared in the ELECTRIC RAILWAY JOURNAL, for Feb. 3, 1917. I believe that a standard classification is very desirable and would be of great benefit to the operating mechanical department as well as to the truck manufacturer. The classification which Mr. Bullock has worked out seems to answer the purpose.

I notice that the last figure represents the carrying capacity of two trucks expressed in thousands of pounds. There is a question in my mind why Mr. Bullock uses the carrying capacity of two trucks instead of one truck. In cars where the two trucks are exactly the same this would probably not be an important point, but many subway and elevated cars are constructed with a motor truck under one end and a trailer truck under the other end of the car. While in general the center-plate load on the two trucks is approximately equal, the other characteristics of the two trucks are usually entirely different, and it appears to me that it would be better to have the last figure in the classification show the maximum carrying capacity of one truck in thousand pounds as all other figures and symbols in the classification refer to one truck.

H. A. JOHNSON, Master Mechanic.

Regenerative Braking of Electric Vehicles

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

EAST PITTSBURGH, PA., Feb. 7, 1917.

To the Editors:

I have read, with interest, the abstract of my paper on "Regenerative Braking of Electric Vehicles," given in your paper, as well as your editorial and the abstract of the discussion of the paper. The abstract of the paper proper is indeed a very correct, complete and concise statement of the subject matter brought out in the paper. There is only one statement which is slightly in error, on page 112, to the effect that with the Lake Erie & Northern locomotive, the same connections are used for both motoring and regenerating. This is not quite correct in so far as the motors are in this case handled as straight series motors during acceleration while they are separately excited during regeneration. As mentioned in the paper, however, it would be possible to use the regenerative connection for motoring by making only very slight changes.

In quoting my remarks made in closing the discussion, you mention in your abstract my stating that I expect railroad men will come to see that the constant-speed motor is what they want. This statement should be somewhat qualified as follows: In considering what is desirable for the railway, it is necessary, first, to find out what is the ideal from a pure transportation viewpoint; and second, how closely such an ideal can be obtained without sacrificing reliability of service and equipment, as well as efficiency, etc. I am of the opinion that from a purely transportation point of view it is most desirable and efficient to operate a train over a certain piece of track all the time at the maximum speed

which is safe for this particular piece of track and for the equipment. It is further desirable that in accelerating, the speed of the train be brought up to this speed as quickly as possible. This means that it is desirable to have a maximum permissible accelerating torque until the maximum speed is reached. In other words, straight-line acceleration up to the maximum speed is desirable. In bringing the train to a standstill it is desirable to have straight-line retardation with the maximum permissible braking torque. Putting the above in ordinary language means that it is desirable from a purely traction point of view to reach a maximum permissible speed as quickly as possible, then to continue running at this constant maximum speed as long as possible, and to finally stop the train in as short a time as possible. It cannot be doubted by anyone that this will give the maximum efficiency of the track. Since the maximum permissible speed is, of course, different for different pieces of track and with different car equipments, it may be necessary to adjust the constant speed for different values under different conditions. In other words, it may be desirable, or necessary, to have an adjustable constant-speed characteristic. The only question which is difficult to decide is whether it should be possible to adjust the constant speed for two, three or more different values.

There are, of course, other points which are of importance from a transportation perspective. It is undoubtedly desirable to have enough margin for making up time to a certain extent. In the writer's opinion, this can best be provided by introducing a period of coasting, which incidentally has the advantage of giving more economical operation with regard to power consumption. Special attention should be called to the fact in this connection that the possibility of making up time by shortening the coasting periods exists alike no matter whether a constant or variable-speed motor is used for acceleration, assuming, of course, that in either case the maximum rate of acceleration and braking available with the particular equipment is being used, as is usually the case.

As previously mentioned, however, it is also of importance that whatever is ideal from a transportation viewpoint be obtained safely and efficiently, and wherever this is not possible it is perfectly justifiable to sacrifice a certain amount in track efficiency in order to obtain reliability. For this reason, the use of the variable-speed series motor is fully justified, although it does not give ideal conditions from a traction point of view. The strong point of the series motor is that it is to a very large degree self-protecting—infinitely more so than the constant-speed direct-current shunt or compound motor. The great successes achieved in traction work by the series motor are, therefore, not due to the fact that this motor is ideal from a traction standpoint, but rather to its great reliability as compared with the shunt and compound motors. As soon, however, as there is a type of motor available which is both reliable and adapted to give adjustable constant speed, there is no doubt but that such a motor should be preferred by the railways. This ideal is most closely approached by the induction motor in all cases where a limited number of constant speeds is satisfactory. There is no doubt but that adjustable constant-speed characteristics of locomotives may also be obtained in time with commutator motors for both direct current and alternating current as the art advances, although certain difficulties have to be overcome in this connection.

With regard to your editorial, in which it is stated that it is a long cry from the present applications of regeneration to trunk lines, to the use of the principle on the motor cars of city and interurban railways, I cannot fully agree. Your argument that first cost and cost of maintenance are most important surely does not apply if additional costs are more than paid for by the savings made possible with regenerative control. The arguments advanced with regard to complication are only applicable within certain limits and depend largely upon the perfection of the additional apparatus. There is no doubt, for instance, but that an air brake with its compressor, compressor motor, air tanks, piping, and valves is infinitely more complicated than a hand brake, and yet nobody doubts nowadays that air brakes should be applied in a large majority of cases. It should not, therefore, by any means be concluded that the addition of a small exciter machine would make regenerative control for city cars prohibitive. The writer is convinced that regenerative braking will be used for such service eventually, although it may not be possible to recuperate as much as 60 per cent of the energy as mentioned in your editorial. Even if it is true that 60 per cent of the power is used for acceleration, it should be considered that a large part of this energy is regained without regeneration by coasting and that regeneration does not give 100 per cent efficiency. Therefore, in most cases it will hardly be possible to regain more than 20 per cent by regeneration. This amount will be about the same with the exciter and the booster system for reasons pointed out in my paper.

R. E. Hellmund,
Railway Engineering Department.

Service Quickly Restored by Railway After Fire

The illustration below shows effects of the fire of Jan. 6, that destroyed some of the buildings and rolling stock and damaged the power plant of the Eastern Pennsylvania Railways at Palo Alto, and of which mention was made in the issue of this paper for Feb. 10, page 272. Enough of the power generating equipment escaped serious injury so that partial service was maintained, and with diligent efforts of the officials and employees, and help from neighboring companies, full service was soon restored.

The storehouse with all of its contents was destroyed and the building which was formerly a paint shop is now used for storing new supplies. The carhouse was also destroyed and contained twenty-one passenger and service cars at the time of the fire. A temporary repair shop has been erected beside the fireproof blacksmith shop, which was only slightly damaged. About 1100 ft. of track with a cinder covering in a new section of



INTERIOR OF EASTERN PENNSYLVANIA RAILWAY'S POWER HOUSE, SHOWING DAMAGE BY FIRE

the carhouse was saved, and over this portion a temporary shelter was built after the fire for making car repairs.

The power plant consists of an old and a new portion, adjoining with no partition wall. This building remains intact, the new part having a tile roof, and damage to equipment was done by water and by falling embers from the roof of the old section. The two turbo-generators of 1000-kw. and 3250-kw. capacity were disabled by broken gages, oil pipes, etc., and damaged by water, but have been repaired and put back in service. Two motor generator sets, a rotary converter, arc lighting circuit, and a transformer which supplied power for plant lighting and for the carhouse were only temporarily disabled, but a direct-current switchboard and two old-style engines and generators used to supply power for the railway peak loads were destroyed. Sheet iron and other material put over the exciters during the fire saved them from damage.

Two Corliss engines and generators supplied all power for about forty-eight hours. During the time when the turbine units were out of order some energy was obtained from the Lehigh Navigation Electric Company. Three 500-kva. transformers were brought about 30 miles and set up at the company's substation at Tamaqua. This afforded car service as soon as the converting apparatus was dried out and repaired. A portable substation obtained from the Monongahela Valley Traction Company filled in for the old-style generators, so that normal rush-hour service was re-established. This was delayed by the addition of grab-handles, end-ladders, 1¼-in. hose and other changes, made to conform with M. C. B. requirements, before it could be accepted for transportation.

The A. I. E. E. Mid-Winter Convention

Electrical Engineers, at New York Meeting, Discuss Among Other Subjects, Generator Heating and Reactance Protection of Electrical Machinery and Circuits

THE fifth mid-winter convention of the American Institute of Electrical Engineers was held in New York City on Feb. 14, 15 and 16, with an attendance of about 500. The papers were largely of a special electro-technical character relating to theory, design and operation of machinery and circuits. The meeting opened with a brief patriotic address by President H. W. Buck, who explained the plan of the engineering societies for co-operating with the war department of the federal government. He stated that the invitation extended by the A. I. E. E. to its membership to enroll with the institute, stating qualifications for military service and circumstances affecting military serviceability had met with a tremendous response. He also explained the plan for an organization to be known as the Engineering Council for United Engineering Societies through which engineers can express themselves as a body on public and engineering matters relating to human affairs.

Among the topics discussed in the papers only two will be mentioned here as of rather considerable interest to the power generation and distribution departments of electric railways. These are the internal temperatures of electric generators, and devices for protecting circuits from excessive overloads. On the first-named topic a paper, prepared by Ralph Kelly, power engineering division Westinghouse Electric & Manufacturing Company, was presented by Prof. Alex. Gray of Cornell University. In this the author outlined a method for calculating the internal temperatures of electric generators. The discussion which followed brought out the difficulties of calculating these temperatures on a rational basis, but emphasized the importance of recognizing the fact that internal temperatures are much higher than external ones. This is, of course, due to the fact that heat can only flow under the influence of "temperature head" or difference of temperature. In flowing from the interior of the machine, when it is generated, to the outside where it is radiated the heat must overcome the resistance due to the imperfect heat conductivity of the materials.

On the subject of circuit and machine protection by means of current-limiting reactors there were two papers, one by J. Allen Johnson, electrical engineer Ontario Power Company, Niagara Falls, Ont., and one by P. B. Juhnke, Commonwealth Edison Company, Chicago, Ill. These and the resulting discussion went to show that while reactance has an excellent protective effect against short-circuits in electric circuits there is a limit to the amount which should be used. Excessive reactance between generators reduces the synchronizing power and thus increases the tendency to hunt. One speaker in the discussion said that in this respect a bus reactor, that is, one connected between sections of a power plant, acts analogously to a mechanical coupling between two generators. If the reactance is too low, comparable with a rigid coupling, the stress imposed on the machines and system during synchronizing may be severe; whereas too high a reactance, comparable with a flexible coupling, may reduce the synchronizing power too much.

Mr. Juhnke told of a short-circuit which occurred near one of the great power plants of his company, causing an automatic disconnection of an 80,000-kw. load. The protective reactors in this case prevented great damage to the equipment and the greater load interruption which must have occurred without them. It was stated that had the reactors not been used mechanical forces up to 1000 lb. per foot might have occurred between parallel conductors.

Society of Terminal Engineers

The Society of Terminal Engineers has just been chartered under the laws of the State of New York with headquarters in New York City for the purpose, among other things, of promoting the study of terminal engineering and mechanical freight handling as a specialty.

The new organization has three grades of membership, viz., members, associate members and juniors. The members grade is open to professors of civil and mechanical engineering, and engineers specializing in terminal work. Associate membership applies to officers and others connected with concerns manufacturing freight handling appliances and terminal equipment, and those whose work and interests enable them to co-operate in the aims of the society. Junior members comprise recent graduates of recognized technical schools who will specialize in terminal engineering, and young engineers qualified to fill subordinate positions in terminal work.

A rate of $6 a year, without initiation fee the first year, has been fixed as dues for membership in the new society. The partial organization so far effected is: President, H. McL. Harding, New York; vice-presidents, Gen. W. H. Bixby, U. S. A., Washington, D. C., and John Meigs, Philadelphia, Pa.; treasurer, W. J. Barney, New York; secretary, J. Leonard, New York. The office of the secretary is at 1133 Broadway, New York. The society will meet once a month in New York.

Practical and Economical Solutions of Problems in

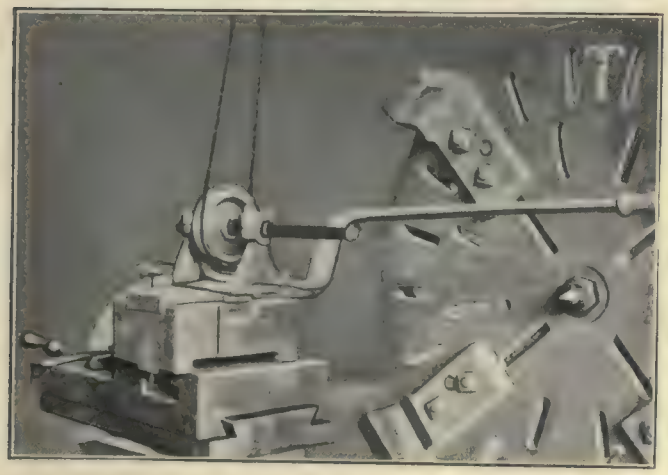
EQUIPMENT AND ITS MAINTENANCE

Pole Raising with Old Emergency Wagon—Twin Cities' New Two-Car Unit—Avoiding "Loose Ends" in Way Department—Maintenance Cost Data in Graphic Form—Good and Bad Bridge Construction

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Spindle of Old Wood Lathe Used for Commutator Slotter

The accompanying illustration shows a home-made commutator slotter constructed by M. B. Osborne, master mechanic Galveston (Tex.) Electric Company. The carriage of a large machine lathe holds a heavy iron block, machined to take the spindle of an old wood lathe which was taken from the company's junk pile. The circular saw which cuts the commutator slot is mounted on the end of this spindle. The armature is mounted



COMMUTATOR SLOTTER USED IN THE SHOPS OF THE GALVESTON (TEX.) ELECTRIC COMPANY

on the large lathe, and the slotter is moved along commutator by means of the long handle shown in the illustration. The cost of constructing this device in the shop was less than $15.

Pole-Raising Equipment Made from Old Emergency Wagon

BY G. H. McKELWAY
Engineer of Distribution Brooklyn Rapid Transit System

A pole-raising wagon which has been in successful use for several months is shown in the accompanying illustration. It consists of an old emergency wagon with a strong gallows frame securely braced and bolted to the floor. When the pole is to be raised at the back of the wagon the block and tackle is placed in the center of the top crossbar, and when the pole is to be raised on the side the block is attached to the end of this crossbar.

Where conditions will permit, the wagon is backed up to the pole hole with the block and tackle suspended from the center of the top bar. A rope sling is made fast to the pole, and the hook which is attached to the pulley block is slipped under it. From the other end of



RAISING POLES BY MEANS OF GALLOWS ATTACHED TO OLD EMERGENCY WAGON

the block and tackle the rope is run down through a pulley attached to the back end of the wagon and then hitched to a team of horses, which raise the pole by drawing on the rope. In this case the rope was attached to a tank wagon that carried water for use in mixing the concrete in which the poles were set.

On some pole-raising wagons the legs of the gallows frame are extended to the ground, but in this case the wagon was amply strong for any size of pole that it might have to raise. When first used, a few bags of cement were placed in the wagon to prevent it from tipping over when the pole was raised at the side. This made the wagon very heavy, and so the load was gradually decreased until it was found unnecessary to carry any ballast at all. Occasionally, however, the wagon has tipped slightly, but this has been stopped by having someone step on the hub of the opposite wheel.

Old Angle Bars Reclaimed by Electric Welding

One of the economies practised by the Puget Sound Traction, Light & Power Company, Seattle, Wash., is the reclaiming of old angle bars by the use of an electric welder. The accompanying photograph shows a



WORN ANGLE BARS BEFORE BEING RECLAIMED BY ELECTRIC WELDING

number of these which have been removed from the track when relaying rail or making other improvements. The angle-bars shown have been worn so badly that they are no longer of use.

In order to reclaim these bars, sufficient additional metal is welded onto the top of the bar with the welder. Usually two layers are built up to make sure that there is plenty of metal, not only at the worn places but also between them. The bar is then planed down to size. It takes about ten minutes for the welding operation and about the same length of time to run the bar through the planer. A saving of from $1 to $1.50 per bar over the cost of replacing with new bars is effected by this scheme.

New Type of Car for Twin Cities

Equipment Which Is Being Tried for Rush-Hour Service Has 26-In. Wheels, Inside Journals, a Low Floor and a Weight of 14 Tons

The Twin City Rapid Transit Company is experimenting with a two-car unit for rush-hour service that is made up of cars of a new type designed by W. J. Smith, master mechanic, and built in the company's shops.

Each of the new cars in the unit is equipped with four GE-258, 25-hp. motors, and 26-in. Davis wheels. The trucks are very light, with arch-bar side frames and a 4 ft. 8 in. wheelbase, and the journals have been placed between the wheels, thus reducing the length of transom and bolster necessary with the customary arrangement of having the side frames outside of the wheels. The brakes are of a specially designed band type.

The level of the car floor is 31 in. above the rail. The car body is 46 ft. long by 9 ft. wide, and in outward appearance is similar to the Twin City Lines standard, except that it is not so high. For the vestibules there have been provided folding doors with wireglass panels in their upper part. These doors are operated by the same type of mechanism that is used for the company's standard folding wire, platform gates. However, the doors will be operated by the conductor instead of by the motorman, as is the rule on the present type of cars.

A different body arrangement has been adopted for the two cars making up the unit, the front car having rear entrance and exit and the rear car front entrance and exit. The front car seats forty-seven passengers, and rear car fifty-four. Both cars are permanently coupled together, and the rear car is not equipped with control, all eight motors being operated by one controller on the front car. A hollow steel coupling carries the power line, air hose, bell wires, etc.

The total weight of the unit of two cars, fully equipped for operation is 55,500 lb., this including double sash for both cars. The present standard Twin City car weighs complete 42,000 lb. when equipped with four GE-200, 40-hp. motors. For comparison, two such cars in a train would weigh 84,000 lb. and would seat ninety-six passengers, while the new unit weighing 55,500 lb. seats 101 passengers. One of the new trucks, complete with motors, wheels and brake equipment, weights 5200 lb.

The company expects to adopt the type of car used in the front of this unit as its new standard. If operation proves successful, more double units will be built for use in the rush hour.



UNIT OF TWO LOW-FLOOR CARS BEING TRIED OUT ON TWIN CITY LINES

Efficiency in Maintenance of Way

Careful Planning and Attention to Detail Are Especially Necessary to Success in This Department

BY DAVID CURTIN
Engineer Maintenance of Way, Bay State Street Railway

Close attention to details is the price of efficiency in all branches of electric railway operation. In the maintenance of way department of any large system, the cost of even small departures from good practice on a local job may lead to serious increases in operating expenses, and unless apparently trifling matters are properly handled the chances of performing work economically are jeopardized. Oversights multiplied over many divisions or work done without thoroughness affect the service and the company's cost sheets far beyond the appreciation of outsiders. There is therefore every incentive to standardize methods in handling routine matters, thereby leaving more time for the consideration of new and important problems.

Experience develops the best ways of handling work, and some of the lessons taught by the past dozen years in the maintenance of way department of this company may be suggestive to others in the same field. I do not mean to imply that our practice has become rigidly standardized, for it is constantly changing as new problems and conditions arise. Instead, I have been persuaded that if I emphasize some of the points which, if neglected, might be classed as "loose ends," the interests of more thorough work will be served.

Whenever matters are taken up with municipal officials by a representative of the way department, the local operating superintendent should be consulted and kept in touch with proceedings, as he is the company's authorized representative in dealing with city or town officials. Lack of co-operation between the departments may lead to delays in carrying out work or to adverse

effects on the service, and economical operation depends upon full team-play. Ample notification should be given to the line department of any plan to break track, so that a temporary return can be installed around the break if necessary. The provision of material for contemplated new jobs is facilitated by having the representative of the way department walk over the work as soon as he is notified that it is to be done and decide as to the economical location of supplies, taking into consideration the location at which track is to be broken and how the work will affect the handling of ties, gravel, etc. It is unwise to distribute more material than will keep the work moving to best advantage.

No time should be lost in reporting to the headquarters of the way department as soon as a member of the staff learns of any street improvements or changes that are to be made. In this class are excavations on account of sewer, water, gas, electric light or telephone connections that are being installed under or near the track, or any work being done by outside parties on bridges, state highways, etc. The progress of such work should be reported to headquarters daily. This may help the way department employee to be prepared with the necessary material, grade papers, etc., and prevent delays in the operation of cars and the progress of trackwork.

Plows and scrapers should be used for all possible excavation work, the men following up and doing all necessary trimming. When possible on a double-track location, with one track being rebuilt at a time, plowing should be done by car. Scrap bonds should be removed from track being torn up and secured in a locked box for subsequent delivery to the storekeeper, and the same care should be taken of supplementary return wire. Spikes should be pulled out as carefully as possible for future use when feasible, using spike plugs in ties to keep out water if the tie is suitable for relaying. Shims should be spiked with large nails to prevent their working out. The line department ought to be notified whenever ground wires are detached from the track during the progress of the work, or found to be broken from the track, before connections are made to the rail.

Bonds improperly applied are most valuable to the company in the junk pile, and as long as such bonds remain in the rails they represent this money equivalent. Installing bonds in damp weather is bad practice. In bonding, drills should be kept sharp and up to gage. When high-speed drills become worn on the flute so that they drill undersized holes, their proper destination is the storeroom. It is a great mistake to install bonds in poorly drilled holes, and careful bonding requires that holes in rail should not be left exposed to rust for any length of time, but should be filled with grease and left until ready to apply the bond terminal. Careful handling of bonds pays, as they become shapeless if not kept snugly in their containers.

The tamping of ties is one of the most important details of modern track construction. The life of track can be greatly cut down by insufficient tamping, especially at the joints. Time is sometimes wasted by continuing to tamp after no further improvement is possible and also in tamping against the sides of ties instead of underneath. Tamping after improvement ceases is liable to raise the track out of surface. Men should tamp in pairs, using bars of the same size and weight, standing on opposite sides of the tie and striking together, for even tamping. Joints should be "coaxed" by tapping on the bottom of the plate and not driven with the sledge, as there is danger of breaking the rail. After joints have been tightened, it is essential to keep them uncovered until after two days of car service, after which the track can be gone over and any remaining slack taken up, using care not to bend the plates. Every joint hole in special work should be bolted, as the life of special work depends on this to a great extent. Whenever special work is received, immediate inspection of it is desirable. It is a mistake to sign for special work as "received in good order" before being satisfied that such is the case. Temporary efforts to save time and trouble along this line may result in considerable inconvenience and multiplied correspondence before matters can be straightened out. An inspection of defective special work by a division roadmaster is expedient before it is sent back to the manufacturer.

Maintenance-of-way employees on a well-managed property are expected to render all possible aid in case of accident; to send in full reports of such occurrences; and to secure the names and addresses of witnesses if the accident appears due in any way to track or roadbed conditions. Ends of rails should be protected by red lanterns when piled or being turned at night and it is most important to safeguard excavations made by outside parties in or near tracks or company property, regardless of the neglect of the lighting by the responsible party. Such lighting should be independent of the regular street-lighting service. Liberality in the use of lanterns pays, as an accident-prevention measure. The disposal of waste material which might otherwise cumber the roadbed or street is important, and this should be done as economically as possible, first considering what the company can use. It is a good plan in disposing of the balance to give the city or town authorities the preference, the remainder being given to residents or taken to the dump, bearing in mind the desirability of minimum haul.

A few words on inspection may be in order in conclusion. Special work should be inspected daily, with particular care for switches and tongues. Track on "fast rail" should be gaged at least once a week and a record of the gage inspection should be kept on file. Immediate removal of erroneous gages is essential. Branch-offs, crossovers and turnout ends that are only used occasionally ought to be maintained in clean condition in case emergency operation requires their use, thereby preventing possible derailments or delays in cleaning them out when occasion arises for their service. The keeping of switch tongues in proper adjustment is a prime factor in the prevention of derailments. High or low manholes, broken manhole covers, irregular paving, if liable to injure car equipment, cause derailment or accident to vehicles should be reported immediately to headquarters. A daily inspection of railroad crossings by oilers with immediate report of any improper conditions is most important. The track for a distance of at least 150 ft. on each side of a railroad crossing as well as the crossing itself should be maintained in the best of repair at all times, as should curves on steep grades or at the foot of grades. Special care should be taken to keep stones out of the flanges of crossings and to spike down or renew loose planks when necessary. Another important daily task is the inspection of track on bridges and in trestles, with special attention to loose bolts and spikes, wide gage, loose or defective planks. Immediate repairs should naturally follow such conditions when discovered.

In many cities the posts on which the fire alarm boxes are located are painted red to make them more conspicuous. For the same reason it is the practice in some railway shops to paint an 8-in. red strip from each fire extinguisher to the ceiling.

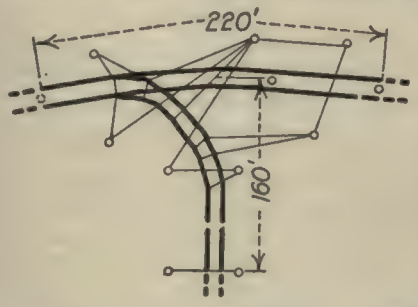
Cost of Erecting Overhead Work—IV

(From the records of a large Eastern company)

The following is the fourth group of a series of diagrams with cost figures to show actual costs of erecting the various types of overhead construction described under conditions of light, ordinary and congested traffic. The preceding groups appeared in the issues for Jan. 20, Jan. 27, and Feb. 10.

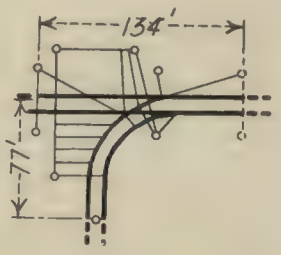
LABOR REQUIRED FOR CONSTRUCTING VARIOUS TYPES OF OVERHEAD TROLLEY SPECIAL WORK UNDER VARIOUS TRAFFIC CONDITIONS

Double track, right-hand branchoff from curved main line, angle 60 deg.



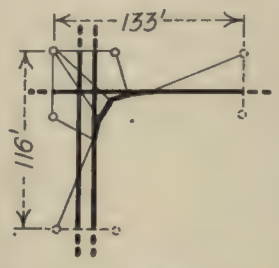
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
26*	$36.30	$26.40	$45.38	$33.00	$54.45	$39.60

Double track, left-hand branchoff, angle 90 deg.



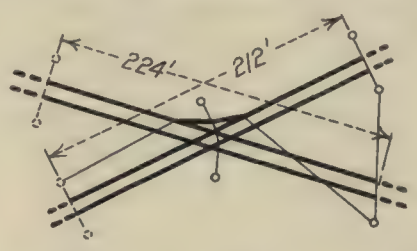
	Light		Ordinary		Congested	
No	Labor	Trucking	Labor	Trucking	Labor	Trucking
27*	$29.04	$21.12	$36.30	$26.40	$43.56	$31.68

Single track crossing double track, with single track connecting curve, angle 90 deg.



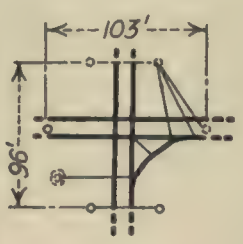
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
28*	$29.04	$21.12	$34.39	$25.08	$43.56	$31.68

Double track crossing double track, with single track connecting curve, angle 45 deg.



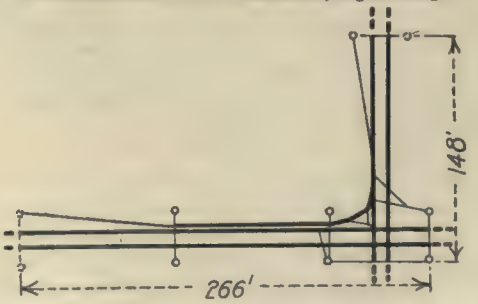
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
29*	$36.30	$26.40	$45.38	$33.00	$54.45	$39.60

Double track crossing double track, with single track connecting curve, angle 90 deg.



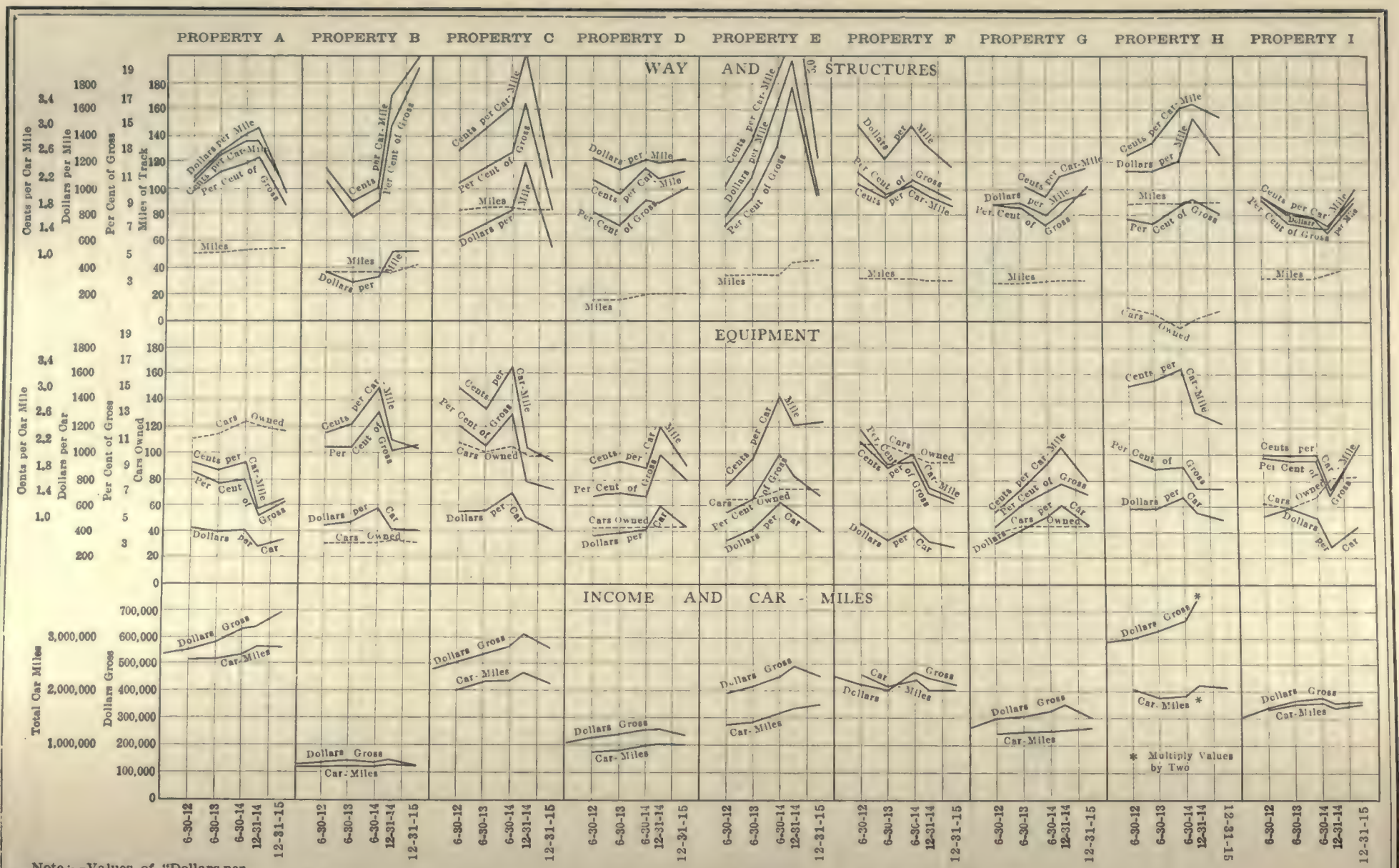
	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
30*	$32.67	$23.76	$39.93	$29.04	$47.19	$34.32

Double track crossing double track, with single track connecting curve, with unbroken main line connection, angle 90 deg.



	Light		Ordinary		Congested	
No.	Labor	Trucking	Labor	Trucking	Labor	Trucking
31*	$27.23	$19.80	$32.67	$23.76	$43.56	$31.68

*Trucking includes cost of extra reel truck. None of the figures on this page includes cost of superintendence and engineering.



Note:—Values of "Dollars per Mile," "Dollars per Car," "Dollars Gross" and "Total Car-Miles" for six months ending Dec. 31, 1914, are doubled to compare with annual figures.

Maintenance Costs on a Number of Electric Railway Properties of Moderate Size

Some Maintenance Cost Data in Graphical Form

Through the courtesy of a company operating a number of railway properties in cities of moderate size, it has been possible to give to the readers of the ELECTRIC RAILWAY JOURNAL the data plotted in the graphs appearing on the page opposite. These bring the record up to the end of 1915. The 1916 data are not included as they cannot be considered typical in view of the prevailing high prices of materials and scarcity of labor.

It will be noted that the cost data are stated in several ways, giving an opportunity for comparison based on income, car-miles operated and miles of track for the way and structures, and on income, car-miles operated, and cars operated for the equipment.

Inspection and Maintenance of Railway Bridges*

Importance of Thorough Inspection, Dangerous Conditions Often Overlooked, Purpose of Guard Rails and Timbers, Use and Abuse of Paint, and Safe Loading Specifications

BY H. C. KEITH
Consulting Engineer, New York City

In the State of New York the board of railroad commissioners was established in 1883, and the failure of three railroad bridges within a year after the commission was organized brought forcibly to its attention the need of investigation of all the bridges in their jurisdiction. Accordingly an order was issued to the railroad companies to file complete plans with strain sheets of all bridges on their lines.

Of about 2500 railroad truss bridges then existing in the State, many were reported to "have been repaired or rebuilt before the strain sheets were submitted to the board" because of conditions found which had previously been unknown or winked at, and 669 truss bridges were repaired or rebuilt because of criticism by the board. As may be judged by these results, this investigation had a very important effect on the safety of the bridges in this State. With regard to the frequency of bridge inspection it may be said that two years is a satisfactory interval between inspections, though in certain individual cases greater frequency is desirable.

Much has been said of the danger of electrolysis and short-circuiting on bridges used by electric railways, and it is a real danger, though serious cases are rare. However, if the steel is found to be charged with electricity the inspector should make thorough examination to learn the cause of the leak and to discover any damage done where the current enters or leaves the steel work.

Timber piles and posts in sea water should be examined between high-water level and a little below low-water level for damage done by teredo or limnoria. In waters infested by either of these pests timbers should be given as great protection as possible, since a pile may otherwise become unsafe in less than two years. Thoroughly impregnating with creosote is somewhat effective as a decided deterrent, though not a sure preventive. If any method of incasing the piles is used the casing should be carried at least 5 ft. below low-water level and somewhat above high-water level. The best protection where practicable is a fill of earth or concrete to somewhat above high-water level, facing with rip-rap if necessary to prevent scour. When the pests are found the extent of their ravages should be thoroughly investigated and recorded. On land white and black ants are sometimes as destructive as the teredo and limnoria are in sea water, but the chief cause of danger to timber on land is rot which is caused by dampness usually aided by warmth.

PAINTING AND PRESERVATIVE COMPOUNDS

Creosoting, kyanizing, vulcanizing, etc., are deterrents rather than absolute preventives of decay. They all act by stopping up the pores of the wood and thus keeping out the moisture. Creosoting is the most effective of these processes, though for soft woods, as spruce and white pine, kyanizing and vulcanizing are of great value. Hard pine that is full of pitch may resist decay as well as if creosoted, but for protection from teredo and limnoria the poison of the creosote adds to the efficiency. Unfortunately, most of the hard pine now in the market has been cut from trees which have been tapped for turpentine, so that the pores are not filled with pitch.

Sometimes a specially careful but unreasoning bridge man paints ties, expecting thus to make them more durable. The result is usually just the opposite; track men and the public soon wear off the paint from the top of the ties allowing moisture to enter there, while the paint on sides and bottom delays the drying; hence the conditions are right for rapid decay. It is of some value to paint the ends (though tar or pitch is better than paint) and it may do some good to paint the top, but the bottom and sides should be left unpainted. The purpose of painting steel work is to protect it from rusting by excluding moisture from contact with the metal. The best of paint cannot be thoroughly effective if dirt is allowed to collect on the steel work, since the dirt holds the moisture which will eventually find its way through the paint and do its destructive work with ever-increasing speed until attended to. A layer of tar or bituminous mixture has been used effectively to protect the steel in some places. When paint is put on over a rust flake the new paint skin is soon broken and worse than useless, since the moisture can get under it and has no chance to dry out. It is of prime importance that the steel be thoroughly cleaned before the paint is applied.

GUARD TIMBERS AND RAILS

The purposes of guard timbers and guard rails should be kept clearly in mind in order that their efficiency for those purposes may be observed. The primary object of guard timbers is to maintain the spacing of the ties to prevent bunching, and the secondary object is to stiffen the floor and make the ties work together. The purpose of the guard rails is to prevent the straying of a derailed truck and to bring back near the proper position a truck that may have been derailed on the approach to the bridge. Inside guard rails are a very important adjunct to a bridge carrying a track. They should be fully spliced or their efficiency will be greatly reduced. Care should be taken that bolts are so placed that neither heads nor nuts can be sheared off by a derailed car. Some engineers do not realize that outside guard timbers do not answer the same purpose. If a wheel is retarded by rubbing against the inside rail it will tend to turn the axle a little, directing the car toward its normal location; but the retarding of a wheel by rubbing on the outside guard timber will swing it further out of line and away from its proper place. This change of direction, too, will throw it against the guard more nearly at right angles, thus making it more likely to climb the guard and leap into whatever disaster is lurking beyond.

Though the outside guard timbers are not qualified for

*Abstract of part of a paper on "Bridge Inspection and Reports," presented before the Brooklyn Engineers' Club on Feb. 8, 1917.

guiding a derailed car, they do have a very important office. Without them, or some substitute, the ties would be likely to become bunched; the guard timbers also help to distribute the load and reduce the danger that the ties will tip up under a derailed wheel when stringers are too closely spaced. Guard timbers should always be bolted to at least every fourth tie.

Any type of construction which makes no provision for the safety of a derailed car is very undesirable. One such construction which seems to be popular is a flitched beam with the rail spiked directly to the timber stringer which is bolted between two I-beams or channels, with no floor between the stringers at all adequate to support a car if it leaves the rail. Another similar construction is a double stringer of I-beams or channels with spiking pieces between, which rest on horizontal separators of short pieces of channel riveted to the beams. Fortunately, many bridges with such stringers have heavy plank floors laid on top of the stringers, thus providing for the safe passage of a derailed car if it does not get too far away from the track stringers. A danger in many highway bridges is that a car may leave the rails and the support provided for it and get on to that part of the bridge where the stringers were designed for lighter loads; perhaps also nearer the center of floor beams competent to carry a car only near one end.

The specifications of the Public Service Commission of Massachusetts for bridges carrying electric railways have been found so satisfactory for the purpose that they have been used with certain modifications in connection with a great many bridges in other states. For the track load these specifications use a 50-ton car with wheel spacing of 5, 15 and 5 ft. and a total length of 40 ft. over all. For roadway and sidewalks loads of 100 lb. per square foot are used for city bridges and 80 lb. per square foot for country bridges 100 ft. or less in length. These uniform loads are assumed to cover the full area of the roadway and sidewalks except a width of 9 ft. at each track. For longer spans these uniform loads are reduced 1 lb. per square foot for every 5 ft. additional length up to 200 ft., and for all greater lengths 80 lb. and 60 lb. per square foot respectively are used. For suburban bridges the floor is designed for the same loads as the city bridges, while trusses and girders are designed as for country loads. For highway bridges in city, town or country the specifications require provision for an alternative roadway load of a single 20-ton auto-truck on two axles 12 ft. on centers and wheels at 6-ft. gage; the weight assumed to be distributed 6 tons on one axle and 14 tons on the other; the truck assumed to occupy a floor space 32 ft. long and 10 ft. wide, the overhang being equal at front and back and at the sides. With track and uniform roadway and sidewalk loads, impact of 25 per cent is added for floor beams and stringers, while for girders and members of main trusses the impact used varies from 25 per cent to 10 per cent, according to the loaded length producing maximum live-load stresses, except that 40 per cent is used for counters and floor-beam hangers. With the auto-truck load 50 per cent impact is used for steel members which receive their full load from one panel point only, and no impact is used for wood floor or stringers. The tension stress allowed by these specifications is 16,000 lb. per square inch of structural steel. Other allowed unit stresses in general correspond with those given in other specifications using the same tensile stress, except that in direct compression these specifications allow only 12,000 lb. per square inch of steel, reduced by the Gordon formula.

Diagrams have been prepared by which may readily be obtained the approximate weights of other single-truck or double-truck cars symmetrically loaded which would give the same moment or shear as the standard 50-ton car of the specifications. By use of these diagrams a quick determination can be made as to whether it is permissible to run any car whose wheel spacing and loads are known over a bridge whose capacity for cars of the standard wheelbase is known.

Coal-Storage Reservoir Constructed After Disastrous Fire

About a year ago a disastrous fire destroyed hundreds of tons of coal at the Brunot's Island generating station of the Duquesne Light Company, Pittsburgh, Pa. Since spontaneous combustion is liable to occur when coal is piled to a greater depth than 15 ft. or 20 ft., a concrete basin is under construction in which 100,000 tons of coal can be protected against fire by being submerged



COAL-STORAGE PIT DURING CONSTRUCTION

in water. The basin will be 25½ ft. deep, 791 ft. long and 153 ft. wide, made of 40 x 50-ft. reinforced concrete slabs, laid so as to permit expansion and contraction. The expansion joints are made waterproof with pitch and tar paper and the abutting ends are supported by concrete 12 in. thick and 4 ft. wide. The inside walls have a 45 deg. slope.

The coal is handled by cranes, and the water for submerging the coal is pumped into the basin through a 14-in. cast-iron pipe leading from the power house to four 12-in. cast-iron outlet pipes placed 160 ft. apart and 6 ft. below the top of the reservoir. The discharge system consists of four 18-in. pipe lines.

Poles Set at Small Cost

The Georgia Railway & Power Company, Atlanta, Ga., has set a considerable number of poles in north Georgia during the past few years, and by using a block-and-tackle method of its own design has been able to set a large number of 50-ft. creosoted poles in a day's time with a minimum number of men and at a cost of 60 cents to 75 cents per pole. In giving this figure E. B. Hook, the superintendent of construction, states that it does not include anything but actually setting and tamping-in the poles. The block-and-tackle method referred to has been used for a couple of years, a pair of mules and nine or ten men being required to set the poles. Recently a 1½-ton truck has been substituted for the mules and the services of six or seven men dispensed with. In this way from twenty-five to forty 50-ft. and 60-ft. creosoted poles, weighing approximately 2 tons each, are being set in a day with three men and the truck at a cost of about 33 cents per pole.

News of Electric Railways

Financial and Corporate | Traffic and Transportation | Personal Mention | Construction News

Connecticut Commission Reports

A Summary Is Also Presented of the Recommendations of the Commission with Respect to New Legislation

The Public Utilities Commission of Connecticut has transmitted its fifth annual report to the Governor covering the year ended June 30, 1916. The report contains a general review of the work of the year together with certain recommendations and suggestions and detailed summaries and analyses of the financial condition of the several classes of companies under its jurisdiction. With respect to the electric railways the commission says in part:

"Passenger service on electric street railways, especially in the large cities, has been inadequate to the reasonable needs of the public. The rapid and almost phenomenal growth of some of the industrial centers created a demand for additional trolley service which the companies were unable to meet, and as a consequence, overcrowded conditions on electric railway cars during rush hours became the rule rather than the exception.

"During the year ended June 30, 1916, the Connecticut Company put into service ninety-two new double truck cars, adapted for summer and winter use. At a conference with the officers of this company in the spring of 1916, the commission recommended the immediate placement of an order for 300 additional cars, to be ready for service during the coming winter. Subsequently, on application of the Connecticut Company, the commission approved the type of construction of 100 additional double truck cars, for which an order was placed, and which were to be ready for service by Nov. 1, but present indications are that actual deliveries will be very much later. The 100 additional cars will not be sufficient to remedy the overcrowded conditions, particularly during rush hours, but should afford material relief.

"Service of the Shore Line Electric Railway on lines of said company supplied with electrical energy from its power plant at Saybrook, has been very unsatisfactory, and for the past six months has been partially suspended. In July, 1916, by virtue of an agreement with the Shore Line Electric Railway, The J. G. White Management Corporation, New York, assumed charge of the rehabilitation of the Saybrook plant, with instructions and full authority to put the same in good serviceable condition. The work has necessarily been slow, but substantial relief has already been secured.

"The Shore Line Electric Railway and the Norwich & Westerly Traction Company have adopted the so-called 'copper zone' as a basis for passenger fares in substitution for the ordinary 5-cent zone system formerly used. This system was made effective on the Saybrook and East Lyme Division on Sept. 1, 1915, on the Norwich & Westerly Traction Company, including the Groton & Stonington Street Railway, on Nov. 22, 1915, and on the New London Division of the Shore Line Electric Railway on Feb. 24, 1916. Patrons of the Groton & Stonington Street Railway petitioned the commission in December, 1915, alleging unreasonable increases in rates incidental to the change to this new plan and the towns of Stonington and Groton also intervened as petitioners in the case. After numerous hearings and inspection of the system the commission issued a finding requiring some adjustment of zones, but the general plan and rates were not otherwise disapproved. From this order of the commission an appeal was taken to the Superior Court which is still pending.

"The total mileage of single track operated by street railways in Connecticut is 830.479 miles. These companies operate outside of the State 341.91 miles, making a total single track mileage operated of 1172.38. The aggregate salaries and wages paid to employees of street railway companies in Connecticut for the year amounted to $4,339,801."

RECOMMENDATIONS FOR LEGISLATION

Among the recommendations of the commission are the following:

A law directing the commission to prescribe uniform systems of accounts for the several classes of reporting utilities, consideration to be given to the systems prescribed by the Interstate Commerce Commission for companies reporting to that commission.

A law whereby the commission may require companies to make returns for the calendar year instead of for the year ended June 30, as at present, such change in reporting year to be made if and when the Interstate Commerce Commission shall, as is now contemplated, require companies reporting to said commission to report for the calendar year.

That Sec. 1 of Chap. 128 of the Public Acts of 1911, be amended by removing the exception of municipal utilities from the operation of the Public Utilities Commission Act, to the extent of giving the commission jurisdiction over municipally owned utilities operating outside the corporate limits of the municipality.

A law requiring the installation of standard advance signs on line of highway, approximately 300 ft. from railroad tracks, at grade crossings, and providing for the maintenance thereof, substantially in accordance with resolutions which were adopted by the National Association of Railway Commissioners, at a meeting in Washington in November, 1916.

In view of the legislation enacted by the 1915 session of the General Assembly, giving the commission jurisdiction over the issuance of securities by the New York, New Haven & Hartford Railroad, the largest public service corporation in the State, the commission suggests the advisability of considering whether or not such authority should be extended over all the utility companies.

Mr. Sanders Optimistic

Street Railway Commissioner of Cleveland Hopes to Continue Three-Cent Fares

Fielder Sanders, street railway commissioner of Cleveland, Ohio, announced on Feb. 16 that the recommendations he will make to Council for the purpose of maintaining low fare are: Retirement of useless officials; gradual payment of the street railway deficit of $450,000, instead of payment in a lump sum; retirement of old cars and purchase of new equipment that will reduce the operating expenses; a safety-first campaign to educate the employees and the public in ways to reduce accidents and consequent damage claims.

On May 1 the trainmen in the employ of the Cleveland Railway Company are to receive an increase of 1 cent an hour in their wages. This will amount to about $200,000 a year. Mr. Sanders said that the operating allowance may have to be increased from 13½ cents a car-mile to slightly more than 14 cents, but that after July the company will purchase additional power from the Cleveland Illuminating Company. Mr. Sanders believes that the saving with purchased power will offset the increase in expenses and make it unnecessary to raise the fare.

The company has indicated its desire for payment in full of the deficit in the operating and maintenance accounts, which Commissioner Sanders proposes to extinguish in monthly installments.

Toledo Situation Reviewed

Sixty-five Weeks of Negotiation Without Results—Direct Deal with Mr. Doherty Suggested

In an editorial in its issue of Feb. 14 the Toledo *Times* dealt with the street railway commission appointed by Mayor Milroy to perfect a settlement of the franchise question with the Toledo Railways & Light Company. The *Times* believes that nothing substantial will ever come from the so-called "community of interest" plan, and that municipal ownership is a hope rather than a prospect. Something of a substantial nature is what the people want, says the *Times*, and it suggests that Henry L. Doherty is willing to play fair, if allowed to propose a settlement upon a proper basis. The editorial follows in part:

"Has it occurred to Mayor Milroy that his street car commission is not a success, that it is not carrying out his wishes? Sixty-five weeks have elapsed since the commission went into action. During those sixty-five weeks the commission has held many sessions. Out of these discussions has been evolved 'the community of interest' plant, a nebulous proposal that is as impractical from the viewpoint of the public interest as anything that could be devised.

"All four members of the subcommittee are supposed to be for municipal ownership. Both Cochran and Thurston urged the people at first that nothing less than a 3-cent fare should suffice, and that the people could own their own street railroad. Mr. Usher is apparently interested in getting the best possible terms for the people, and Mr. Wright's attitude might be described as nondescript.

"There is no talk of 3-cent fare in the commission now, and municipal ownership has diminished to little more than an echo. The commissioners indeed are discussing 5-cent fares quite generally, and as for municipal ownership, it has been discovered that the people of Toledo are not properly educated for it. During the period of instruction the people are to pay 5-cent fares and enjoy the kind of service provided by men who do not know anything more about running a street railroad than a pig knows about gardening.

"If what the commission has done so far is a sample of what it proposes to do, the people prefer to deal directly with Mr. Doherty. They want action of a positive kind, action that will give them either better service for the prevailing fares or present service at lower fares, although the *Times* is confident they would vote for better service. If Mr. Doherty can submit a plan that is fair, there is every reason for thinking that the people will accept it. Surely it is neither just to the commissioners nor to the people of Toledo that they be kept longer in service."

Six Months for Stealing Fares

Atlantic City Conductor Sentenced—Bridgeport Conductor Apprehended

Judge C. C. Shinn in the County Court House at May's Landing, N. J., on Feb. 14, sentenced Thomas Barlow to six months in the county jail. Barlow was employed as a conductor on the Atlantic Avenue line of the Atlantic City & Shore Railroad last summer, working just twenty-three days when discovery was made that he was collecting and retaining fares.

On Feb. 14 the police of Bridgeport, Conn., arrested W. J. Windsor of Delaware, said to be the leader of a gang that has been swindling electric railways in the East. He waived his extradition rights, saying he was willing to go back to Atlantic City, where he is wanted. According to the information of the detective bureau at Bridgeport the gang started work in Wilmington, by making application for work as conductors. Members of the gang would give references and on writing to these the men would be highly recommended. When they got work they would start in robbing the company. They are believed to have worked in twelve cities under as many names and are said to be wanted with a number of others. Windsor went to work for the Connecticut Company in Bridgeport as a conductor about a month ago. When arrested he had charge of a car on the East Main Street line.

$1,000,000 Power Plant for Columbus

Plans have been completed by the Columbus Railway, Power & Light Company, Columbus, Ohio, for the construction of a power house on the Hocking Valley Railroad, 6 miles south of the city, to cost about $1,000,000.

It has been decided to concentrate power production in the proposed plant, and abandon the Spring Street and the Third Street stations. The company will also give up the plan of building on the bank of the Scioto River, just north of West Broad Street. The property there will be put to some other use.

It is stated that the company has already placed orders for a portion of the equipment of the proposed power house and that the right-of-way has been secured for the high-tension transmission lines into the city.

The company will ask the Public Utilities Commission for authority to issue $1,640,379 of securities. A portion of the proceeds will be used to construct and equip the power house and the remainder for the purchase of additional cars and other equipment necessary. In addition, the company desires to issue securities for funding about $500,000 spent in making improvements last year.

Further Reprisals Against I. T. S.

A resolution has been introduced in the Board of Aldermen of St. Louis, Mo., directing the law department to take steps to collect the mill-per-passenger tax from the Illinois Traction Company since it began operations in 1909.

Officials of the company were notified recently by city officials that the tracks of the line in Venice would be torn up on Feb. 22 unless the company agreed to reduce its fare from Venice to St. Louis from 10 cents to 5 cents. This is the second ultimatum regarding the removal of the tracks which has been sent to the company by the Venice officials. A month ago the city wanted to remove the tracks and the railway officials asked for more time in which to confer with the city officials in hope of reaching an agreement.

Progress on East Bay Franchises

The Legislature of California has approved by concurrent resolution the charter amendments to the charters of Oakland and Berkeley, and has approved the new charter for Alameda, all without amendment or alteration.

These charter amendments enable the Common Councils of these cities to enter upon negotiations for the resettlement of the franchises of the public utilities operating within their limits, and more particularly for the resettlement of the franchises of the San Francisco-Oakland Terminal Railways, Oakland, Cal. All of these amendments have received the approval of the citizens and are now effective.

The next step is the application required to be made by the railway to the Councils requesting that these negotiations be entered upon. When such applications are made it will become the duty of the respective mayors of these cities to appoint committees of seven citizens selected with the power and for the purpose of passing upon and considering the character of resettlement franchise which shall be granted in each instance. When such committees of citizens have determined upon the conditions and circumstances under which resettlement franchises shall be granted, they report their conclusions to the Common Councils, and the Councils are then empowered themselves to consider and pass upon such report and to continue in the negotiations with the railway. After these negotiations have resulted in an agreement, ordinances embodying the terms of the resettlement franchises are to be adopted by majority vote of the Councils, and thereupon such ordinances are to be submitted to the vote of the people. If a majority of the citizens voting thereon approve the same, they become effective and constitute a new contract between the communities and the railway under which they will be authorized to operate for an indefinite period.

Applications for resettlement are being prepared on behalf of the railway and will be shortly submitted to the Councils of the cities in which the company operates for the purpose of commencing these negotiations.

Chicago Considers Fifty-Year Grant

At the meeting of the local transportation committee of the City Council of Chicago, Ill., on Feb. 19, Walter L. Fisher, counsel for the committee, was directed to prepare a bill which would make possible the granting of a fifty-year franchise to the consolidated surface and elevated lines and provide for their acquisition by the city at any time during the period of the franchise. The bill previously proposed by the committee was for a thirty-year period and included a clause which prohibited the city from taking over the property until a certain per cent of the capital had been amortized. With this clause inserted, Mr. Fisher stated that the thirty-year franchise was of no consequence and that the city might as well grant a fifty-year franchise with the city having power to take over the property at any time. L. A. Busby, president of the Chicago Surface Lines, told the committee that it would be impossible to finance the proposition on a thirty-year franchise unless the per cent of the capital should be fixed upon that was to be amortized before purchase by the city became possible.

With these differences before the Council committee, the fifty-year franchise bill was ordered drawn, and will be brought before the committee together with the thirty-year franchise bill for joint discussion at the next meeting.

Great Northern Considering Electrification

The Great Northern Railway is making a study looking toward the possible electrification of some 300 miles of its main line between Spokane and Seattle. Engineers from the Westinghouse and General Electric companies are working up preliminary data at the present time, and no decision as to the character of the installation has been made. However, it is anticipated that the company will proceed with this project in 1918, though nothing has been authorized as yet. The project has been initiated because of the successful operations of the Chicago, Milwaukee & St. Paul's electric zone. Whether or not it is to be carried out in the immediate future depends upon developments in the foreign and domestic situation during the next few months, the programs for improvements on Western railroads in general being held largely in abeyance just at present.

$800,000 Project for Newark

Extensions of Hudson River Tunnels System to New Newark Terminal

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., outlined on Feb. 19 a plan before Mayor Thomas L. Raymond in Newark for an underground extension of the tracks of the Hudson & Manhattan Railroad in Newark, with a terminal under the apex of Military Park and Park Place in that city. The project is designed to connect the tube line with the Public Service Railway terminal on Park Place.

For more than a year past the Pennsylvania Railroad and Public Service Railway have been negotiating with reference to a combination of their terminal facilities in Newark.

It is proposed to abandon the present Park Place Station of the Pennsylvania as a terminal and to utilize the ground now covered by it to depress the tracks below street grade; to cause the tracks thus depressed to cross underneath Park Place and Center Street at their junction and continue under Park Place and a limited portion of Military Park to a sub-surface station located approximately at the apex of the park, which sub-surface station will be provided with convenient and direct means of ingress and egress to Broad Street and to the concourse floor of the Public Service Railway terminal.

By this means the whole Public Service Railway system, local, suburban and interurban, will be brought into direct connection with the high-speed line of the Pennsylvania Railroad and the Hudson & Manhattan Railroad to uptown and downtown New York, and, through it, with the whole metropolitan transportation system with which it connects.

This plan is a return, in an enlarged sense, to the original location proposed by the Pennsylvania for its terminal in Newark, which at the time was favored by the city authorities, but which was abandoned because the necessary enabling act passed by the Legislature of 1910 was vetoed by Governor Fort. The construction of the Public Service Railway terminal in the meantime has accentuated the desirability of this location for the terminal.

Railway Men on Defence Committee

Matthew C. Brush, president of the Boston Elevated Railway; P. F. Sullivan, president of the Bay State Street Railway; Clark V. Wood, president of the Springfield Street Railway and the New England Street Railway Club, and C. D. Emmons, general manager of the Boston & Worcester Street Railway, have been added to the Massachusetts transportation committee which is investigating railway co-operative measures related to the present international crisis. Many men well known in the engineering and utility fields are associated with the main organization, under the chairmanship of James J. Storrow of Lee Higginson & Company, Boston. Among the members of the committee on industrial survey are Howard Rogers, of the Stone & Webster Engineering Corporation, Boston, vice-chairman, Walter C. Fish of the General Electric Company, Lynn, Mass., and Howard Coonley of the Walworth Manufacturing Company, South Boston. Fred T. Ley of F. T. Ley & Company and G. Dresser, superintendent of the New England Telephone & Telegraph Company, are members of the committee on emergency help and equipment. At a meeting of the executive committee in Boston on Feb. 19 General Sir Sam Hughes, former organizer of the Canadian overseas expeditions, conferred with those present upon preparedness problems from the standpoint of civilian aid.

Increase in Wages in Fargo.—C. P. Brown, general superintendent of the Fargo & Moorhead Street Railway, Fargo, N. D., has announced an increase in the wages of the trainmen in the employ of the company. The employees have been receiving from 19 to 24 cents an hour, based on length of service. Under the new scale the men will receive from 20 to 25 cents an hour.

Bill to Provide Steam and Street Railway Connection.—Representative Gans of Philadelphia, Pa., has introduced a bill into the Legislature of Pennsylvania, amending the public service law so as to provide for switch and other connections between street railways and steam railroads when required by the Public Service Commission, and establishing through and joint fares.

Electrification Nearing Completion.—The work of electrifying the West Side line of the Southern Pacific Company into Corvallis, Ore., is practically completed, and it is expected the line will be ready for operation before April 1, the official date for the opening. McCoy, 8 miles south of Whiteson, has been the northern terminus of the electric division of the Southern Pacific Company.

Franchise Controversy in Muskegon.—A controversy has developed between the Muskegon Traction & Lighting Company, Muskegon, Mich., and the city over conditions of the street railway franchise of the company, which has until 1931 to run. Officials of the company have announced their willingness to enter into negotiations for a new grant, but only on condition that the validity of the present rights of the company to operate be not contested by the city in court.

Savings Bank Reviews Toledo Utility History.—The Home Savings Bank of Toledo, Ohio, issues an eight-page monthly business letter for the purpose of giving its depositors and customers information concerning the business life of the city. The current issue contains an historical sketch of the Toledo Railways & Light Company, operated by Henry L. Doherty & Company. The article briefly reviews the inception of the Toledo Gas Company in 1853, the securing of a franchise for the operation of a street car system, and finally the merging of several companies into the Toledo Railways & Light Company.

Payment of Strike Damage Award Advised.—The Board of Supervisors of Erie County, N. Y., has been advised by the County Attorney to pay the judgment of $2,862 returned against it by a jury in Supreme Court in favor of the International Railway, Buffalo, N. Y., for damages to the company's property during the street car strike riots several years ago. It is said that if the International Railway appeals the case on the ground that the verdict was too small, the county will file a cross appeal. The company asked for more than $100,000 damages, including the losses in fares. The award of the court was made for damage to the physical property only.

N. Y. C. Improvement Opposed.—The Public Service Commission for the First District of New York, in response to the request of Governor Charles S. Whitman, has directed its engineers and experts to furnish the Governor with estimates of the value of the lands and rights to be conveyed to the city of New York by the New York Central Railroad and by the city to the railroad under the proposed so-called West Side agreement. The plan is an ambitious one, and involves electrification of the lines affected. At the public hearings which have been held on the matter considerable opposition has developed on the part of the public to certain features of the plan.

Important Bills in Ohio.—The Chapman bill, which, if passed, will impose upon Ohio the terms of the Clayton Federal law relating to injunctions in labor disputes, has been recommended by the labor committee of the House and will be placed upon the calendar. It legalizes boycotting, picketing and personal persuasion, makes labor a personal rather than a property right, prohibits injunctions in labor troubles and declares that no indictments shall be returned against persons for performing acts which are not forbidden to the individual. In the House Harry Israel has presented a bill which, if enacted, will bring municipally owned utilities under the supervision of the Public Utilities Commission.

Canadian Northern Railway Plan Opposed.—The Hydro-Electric Commission of the Province of Ontario, Canada, is opposing the application which has been made to the Dominion Parliament by the Canadian Northern Railway for approval of its plan for a railway through Halton, Wentworth and Lincoln Counties. This is part of the proposed $7,000,000 double-track line to connect Toronto, Ont., with the Niagara frontier at Niagara Falls. The commission has addressed communications to the village authorities along the proposed route claiming that approval of the Canadian Northern Railway's plan would be detrimental to the development of the proposed hydroelectric proposition connecting Toronto with Niagara Falls, Ont.

Nine-in-Eleven-Hour Bill Opposed.—William Bradley, president of the Cumberland County Power & Light Company, Portland; Judge Newell, representing the Lewiston, Augusta & Waterville Street Railway; John A. Morrill, representing the Rockland, Thomaston & Camden Street Railway, Rockland; George L. Emery, representing the Biddeford & Saco Railroad, and Thomas Lee, representing the Aroostook Valley Railroad, Presque Isle, and others appeared before the committee on labor of the Maine Legislature recently in opposition to the so-called nine-in-eleven hour bill for electric railway employees, presented to that body. This measure was noted briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 27, page 178.

Projected Subway for Madrid.—According to *Vida Financiera* (Madrid), the Spanish Ministerio de Fomento has granted a concession, under date of Jan. 12, to Don Miguel Otamendi for the construction and working, for a period of ninety years, of an underground electric railway system in Madrid, to be known as the Metropolitano de Madrid Alfonso XIII. There will be four double-track lines. The capital necessary for the construction of the complete system, embracing a total distance of 8.7 miles, is approximately $6,000,000. A period of eight years will be allowed for the completion of the undertaking. The first line to be constructed will cross the city from north to south; it will be 2.5 miles long, and is estimated to cost $1,600,000. Work is to be commenced shortly. This section must be completed within three years.

Financial and Corporate

Electric Railway Statistics

Returns for November, 1916, Compared with Those for the Corresponding Month of 1915, Show That Operating Ratio Is Increasing

A comparison of electric railway statistics for November, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicates an increasing growth in the operating ratio. Data for November, representing 7502 miles of line of companies scattered throughout the country, indicate an increase in operating revenue of 3.65 per cent and in operating expenses of 8.50 per cent, but a decrease in net earnings of 3.83 per cent. Data representing 5707 miles of line show an increase in the amount of taxes paid of 26.03 per cent and a decrease in the operating income of 12.29 per cent.

Of the groups shown in the accompanying table, data for the Western, represented by 1808 miles of line, indicate an increase in operating revenues of 5.09 per cent, in operating expenses of 5.49 per cent and in net earnings of 4.38 per cent. Data for companies represented by approximately 90 per cent of this mileage show an increase in the amount of taxes paid of 5.90 per cent, while the operating income increased 3.03 per cent.

The Southern district makes the next best showing. Data for companies represented by 824 miles of line indicate an increase in operating revenues of 5.70 per cent, in operating expenses of 7.20 per cent and in net earnings of 3.70 per cent. The amount of taxes paid by companies represented by about 570 miles of line increased 19.27 per cent, but in spite of this there is shown an increase in operating income of 2.94 per cent.

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR NOVEMBER, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
*United States**	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$16,408,227	3.65	$13,963,989	1.99
Operating expenses	10,421,543	8.50	8,800,554	7.48
Net earnings	5,986,684	†3.83	5,163,435	†6.18
Taxes	.....	...	1,106,304	26.03
Operating income	.....	...	4,057,131	†12.29
Operating ratio, per cent:				
1915	63.51	...	63.02	....
1916	60.68	...	59.80	....
Miles of line represented	7,502	...	5,707	....
*Eastern District**				
Operating revenues	$11,908,196	3.07	$10,106,494	1.00
Operating expenses	7,598,935	9.53	6,388,423	8.42
Net earnings	4,309,261	†6.64	3,718,071	†9.64
Taxes	.....	...	807,345	34.12
Operating income	.....	...	2,910,726	†17.14
Operating ratio, per cent:				
1915	63.81	...	63.21	....
1916	60.05	...	58.88	....
Miles of line represented	4,870	...	3,535	....
*Southern District**				
Operating revenues	$901,444	5.70	$598,848	5.23
Operating expenses	523,447	7.20	331,111	4.43
Net earnings	377,997	3.70	267,737	6.24
Taxes	.....	...	60,842	19.27
Operating income	.....	...	206,895	2.94
Operating ratio, per cent:				
1915	58.07	...	55.29	....
1916	57.26	...	55.72	....
Miles of line represented	824	...	570	....
*Western District**				
Operating revenues	$3,598,587	5.09	$3,258,647	4.58
Operating expenses	2,299,161	5.49	2,081,020	5.14
Net earnings	1,299,426	4.38	1,177,627	3.60
Taxes	.....	...	238,117	5.90
Operating income	.....	...	939,510	3.03
Operating ratio, per cent:				
1915	63.89	...	63.86	....
1916	63.65	...	63.52	....
Miles of line represented	1,808	...	1,602	....

*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.
†Decrease.

The Eastern district is apparently suffering not only from the after effects of the late labor disturbances in New York City, but as well from the constantly growing costs of materials and labor. Returns from companies represented by 4870 miles of line, or approximately 60 per cent of the total mileage shown, indicate an increase in operating revenues of 3.07, an increase in operating expenses of 9.53 per per cent and a decrease in net earnings of 6.64 per cent. The tax burden is also growing, the result being a decrease in operating income of 17.14 per cent.

For the last few months there has been apparent a continual growth in the operating ratio. For November the operating ratio of the United States as a whole increased from 60.68 in 1915 to 63.51 in 1916. The increase in the Eastern district was from 60.05 in 1915 to 63.81 in 1916, while smaller increases occurred in the Southern and Western districts.

Annual Report

N. Y., N. H. & H. R. R.—Affiliated Electric Lines

The annual report of the New York, New Haven & Hartford Railroad for the year ended June 30, 1916, contains income statements for its various affiliated electric lines, as shown in detail in the accompanying statement. All of these companies, with the exception of the New York, Westchester & Boston Railway, are controlled through the ownership of all the stock, the percentage of control in the excepted case being 98.4 per cent. All are controlled directly except The Connecticut Company, which is held through the New England Navigation Company.

During the fiscal year ended June 30, 1916, all the affiliated lines operated at a loss with the exception of The Rhode Island Company and The Connecticut Company. Two of the four losing companies failed to meet operating expenses and taxes, but all showed an improvement in operating ratio over the preceding year. In most cases this resulted from decreased operating expenses. The operating expenses and taxes of the New York, Westchester & Boston Railway during the year amounted to 8.85 per cent in excess of the operating revenues, a decrease of 1.08 per cent from the percentage excess in 1915. The deficit as of June 30, 1916, was $5,795,233. For the Berkshire Street Railway the operating expenses and taxes were 82.42 per cent of the operating revenues, an improvement of 8.46 as compared to the percentage in 1915. The deficit at the end of the year totaled $462,372. The New York & Stamford Railway cut its operating and tax ratio by 0.72 per cent to 79.99 per cent, its total deficit amounting to $94,430, while the Westchester Street Railroad reduced its similar ratio by 0.95 per cent to 101.91 per cent. In this case the accumulated deficit at the end of the year was $92,638.

The operating revenue of The Rhode Island Company during the last year showed an increase of $400,737 or 7.8 per cent, which more than made up for the decrease of $295,011 in the preceding year. The operating expenses increased $139,430 or 4.0 per cent, however, so that the net operating revenue gained $261,306 or 15.9 per cent. Taxes rose $18,601 or 3.9 per cent, but the ratio of operating expenses and taxes to operating revenues was cut to 74.19 per cent, a decrease of 2.74 per cent. Non-operating income fell off, but income deductions were decreased to a greater extent, the final result being a gain of $249,002 from the deficit of $115,428 the year before. The credit to the profit and loss account as of June 30, 1916, was $885,145.

In the case of The Connecticut Company the gain in operating revenues amounted to $987,153 or 11.1 per cent as compared to a loss of $124,578 the year before. Operating expenses, however, rose $439,248 or 8.4 per cent, so that the net operating revenues gained $547,905 or 19.1 per cent. The showing was further bettered by a decrease in taxes of $112,062 or 21.4 per cent. The operating expenses and taxes were 67.66 per cent of the operating revenues, a decrease of 4.28 per cent from the 1915 percentage. Non-operating income fell off, but in spite of this, with income deductions showing a slight decrease, the net income rose $631,216 or about 47 per cent. In 1915 the company paid dividends of $400,000, a decrease of $1.100,000, but this year it paid $600,000 and carried forward a profit and loss credit of $2,129,366 as compared to $1,016,886 the year before.

INCOME STATEMENTS OF AFFILIATED ELECTRIC RAILWAYS OF NEW YORK, NEW HAVEN & HARTFORD RAILROAD FOR YEAR ENDED JUNE 30, 1916, WITH CHANGES FROM PRECEDING YEAR

	New York, Westchester & Boston Railway		Berkshire Street Railway		Rhode Island Company		New York & Stamford Railway		Westchester Street Railroad		Connecticut Company	
	1916	*Change*	*1916*	*Change*	*1916*	*Change*	*1916*	*Change*	*1916*	*Change*	*1916*	*Change*
Operating revenues	$513,325	+$63,445	$956,968	+$5,771	$5,484,874	+$400,737	$378,561	+$2,478	$252,276	−$5,874	$8,947,974	+$987,153
Operating expenses	438,730	+59,695	731,879	−70,880	3,577,704	+139,431	278,610	−8,308	244,693	−9,693	5,643,902	+439,248
Net operating revenue	$74,595	+$3,750	$225,089	$76,651	$1,907,170	+$261,306	$99,951	+$10,786	$7,583	+$3,819	$3,304,071	+$547,905
Taxes	120,025	+4,496	56,822	−4,857	491,312	+18,601	24,189	+7,572	12,410	+1,257	410,165	−112,062
Operating income	†$45,430	−$746	$168,267	+$81,508	$1,415,858	+$242,705	$75,762	+$3,214	†$4,826	+$2,562	$2,893,905	+$659,967
Non-operating income	52,752	+33,404	2,223	+551	119,783	−1,972	592	+130	337	+185	244,950	−30,553
Gross income	$7,322	+$32,658	$170,490	+$82,059	$1,535,641	+$240,733	$76,354	+$3,345	†$4,489	+$2,747	$3,138,856	+$629,414
Deductions from gross income	1,523,396	+99,033	*257,545	+51,025	*1,402,067	−8,270	*95,899	+847	*20,399	+4,292	1,184,182	−1,802
Net income	†$1,516,074	−$66,375	†$87,055	†$31,034	$133,574	†$249,003	†$19,545	†$2,497	†$24,888	−$1,545	‡$1,954,673	‡$631,216

†Deficit.

*The 1916 deductions from gross income in the case of the Berkshire Street Railway include $213,199 for interest accruing to the New York, New Haven & Hartford Railroad, but not included in the income account of that company. Similar items included for other companies are as follows: Rhode Island Company, $195,008; New York & Stamford Railway, $38,569, and the Westchester Street Railroad, $19,126.

‡The Connecticut Company paid dividends of $600,000, an increase of $200,000, and had a surplus of $1,354,673 for the year, an increase of $431,216.

New Directors in St. Louis

Minority Interest, Voting Under the Cumulative Plan, Elect Four Representatives to the Board

The eleven directors of the United Railways, St. Louis, Mo., elected at the annual meeting held on Feb. 12 were: A. J. Siegel, G. W. Norton, John C. Roberts, John I. Beggs, A. C. Brown, Murray Carleton, D. R. Francis, Jr., Richard McCulloch, Henry S. Priest, A. L. Shapleigh and H. C. Cole. The new directors are: A. J. Siegel, St. Louis; H. C. Cole, Waterloo, Ill., John C. Roberts, St. Louis, and George W. Norton, Louisville, Ky. Breckenridge Jones and John L. Green failed of election. J. D. Mortimer, president of the North American Company, who was one of the 1916 directors, was not placed in renomination. The names of James Adkins, secretary and treasurer of the United Railways, and H. P. Hilliard, both of whom were directors last year, were not placed on the ticket.

Messrs. Siegel, Cole, Roberts and Norton, the new directors, were supported by the minority stockholders, who were represented by George Dieckman and Ephraim Caplan. The minority stockholders concentrated their voting power upon Messrs. Cole. Roberts, Siegel and Norton under the cumulative voting right secured to the stockholders.

Henry S. Priest, attorney for the company and a director last year, was re-elected. Considerable opposition had developed to Mr. Priest among minority interests in the company, but the vote of the minority, as previously stated, was concentrated upon Messrs. Cole, Siegel, Norton and Roberts.

At the meeting of the newly elected board of directors held on the afternoon of Feb. 20, all the old officers were reelected. A new executive committee was named composed of

J. I. Beggs, D. R. Francis, Jr., A. L. Shapleigh, A. J. Seigel and George W. Norton. Messrs. Seigel and Norton represent the minority stockholders. H. S. Priest was retained as general counsel in an advisory capacity, but with no reduction in salary. Thomas E. Francis, one of Mr. Priest's former assistants, was appointed general attorney and will take charge of all damage suits and litigation of a routine character. He will devote his entire time to the position with offices at the headquarters of the company.

U. R. R. Factions Come Together

New Tentative Reorganization Plan Appears Satisfactory to All Interests—Bonds and Common Stock Largely Substituted for Preferred

The two rival protective committees for the 4 per cent bonds of the United Railroads of San Francisco have come together and reached a tentative understanding regarding the reorganization of the company. Under the modified plan the new securities will be $47,698,000, instead of $47,598,000 as under the old plan, thus preserving practically all the proposed cut in capitalization from the $91,928,100 now outstanding. The character of new securities is changed, however, bonds and common stock being largely issued in lieu of preferred stock as originally proposed. Under the old plan the holders of the 4 per cent bonds were to receive 25 per cent of the face value of their bonds in new 5 per cent bonds and 46 per cent in 6 per cent preferred stock, a total of 71 per cent, while under the new plan they will receive 66 2/3 per cent in new 6 per cent bonds, 8 per cent in 6 per cent preferred stock, and 33 1/3 per cent in common stock, a total of 108 per cent. Moreover, an entirely new corporation to issue the new securities is proposed, instead of utilizing the existing subsidiary, the Market Street Railway, as the reorganization medium.

While the main features of the proposed changes appear to be satisfactory to all interests, no formal agreement has yet been made, and the details have not yet been worked out. When this has been done, the changes will be submitted to the bondholders and to the California Railroad Commission for approval. The original reorganization plan was described in the ELECTRIC RAILWAY JOURNAL of Oct. 7, 1916, page 744, and the opposition movement in the issue of Nov. 25, 1916, page 1127.

The tentative understanding now reached by the two protective committees was explained in a statement which was given out on Feb. 10 on behalf of both committees after conferences lasting nine days. In this statement it was said that the representatives of the protesting Eastern committee were now entirely satisfied with the work of the other or original reorganization committee, and that the successful consummation of the reorganization seemed assured. Regarding the tentative amendments to the plan, the statement said:

"It is believed by all that the recent decision of Circuit Judge Hunt, permitting the city to parallel the tracks of the United Railroads on Market Street, unless reversed by the Appellate Court, will create such a diminution of the company's revenues as to endanger the dividends on the preferred stock which the bondholders were to receive under the present plan, in view of the large annual payments which were necessary to be made for the retirement of the $2,500,000, of proposed debentures prior to 1924. For that reason, it is the unanimous opinion that a change in the plan is imperative, in order to eliminate the debentures and to provide for the raising of $2,200,000 in cash in some other way.

"The plan which seems most practicable is to use the net income of the company up to April 1, 1918, which it is estimated will amount to at least $2,200,000, for the purpose of retiring the matured $1,800,000 of Market Street 6 per cent bonds and $400,000 of Ferries & Cliff House 6 per cent bonds, and to issue to the bondholders, in consideration and exchange for the coupons of the present bonds which mature up to April 1, 1918, 6 per cent bonds of a new company to be formed of an equal face amount.

"To this end it is proposed to create a new corporation which shall succeed to the properties of the United Railroads of San Francisco and which will issue new 6 per cent bonds in the amount of $15,600,000, first preferred stock in the amount of $2,000,000, second preferred stock in the amount of $5,500,000, and $14,500,000 of common stock. The present bondholders will then receive 66 2/3 per cent of the face of the bonds which they now hold in 6 per cent bonds of the new corporation, 8 per cent in first preferred stock, and 33 1/3 per cent in common stock, a total of 108 per cent in bonds and stock of the new corporation for 100 per cent of their present bonds and 8 per cent of coupons.

"The unsecured creditors and stockholders will pay $3,000,000 in cash for $3,000,000 of Market Street 5 per cent bonds as and when it becomes necessary to raise this money for the purpose of paying off the $2,000,000 of Omnibus Cable Company bonds and $1,000,000 of Sutter Street Railway bonds which mature in 1918. In this way, all of the underlying bonds which are ahead of the Market Street 5 per cent bonds will be taken care of, and the present Market Street 5 per cent bonds will remain undisturbed, except for the issuance of the additional $3,000,000 of bonds at par.

"The unsecured creditors and stockholders will also surrender the unsecured notes which they now hold aggregating $3,665,000, and all their claims against the company for unpaid dividends on preferred stock, as well as all their preferred and common stock, and the company will surrender to them the notes of the Railroads & Power Development Company and the debentures of the United Railroads and of the United Railways Investment Company, as provided in the present plan."

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission for the First District of New York has before it for approval an application from the Brooklyn, Queens County & Suburban Railroad for permission to issue $299,543 of additional bonds.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Proceeds of the $1,640,379 of 5 per cent bonds and $508,000 of Series A 6 per cent preferred stock of the Columbus Railway, Power & Light Company for the approval of the issue and sale of which application has been made to the Ohio Public Utilities Commission, will be used to reimburse the treasury of the company for capital improvements made in 1916 and for new extensions and additions in the current year. The principal capital improvement to be made this year by the company will be the construction of a new central generating station on which the initial expenditure will be in excess of $1,000,000. The general plan for this improvement is referred to in this issue of the ELECTRIC RAILWAY JOURNAL, page 360.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—The Massachusetts Public Service Commission has authorized the issue of an additional $150,000 of 4½ per cent refunding bonds by the Fitchburg & Leominster Street Railway, due on Feb. 1, 1921, to refund $150,000 of first mortgage 5 per cent bonds due on April 1, 1917. This will make $300,000 of the 4½ per cent bonds outstanding. The total issue authorized is $350,000.

Pittsburgh (Pa.) Railways.—An offer has been made by the Philadelphia Company to give to each preferred shareholder of the United Traction Company 66 2/3 per cent of his holdings in a 5 per cent mortgage bond of the Pittsburgh Railways, to be guaranteed principal and interest by the Philadelphia Company; or, as an alternate proposition, to pay holders $25 in cash for each share of stock, the par of which is $50. The proposition was submitted by the management of the Union Traction Company to the protective committee for the preferred stockholders, looking toward a settlement of the present litigation. Stockholders who have not already deposited their certificates are urged by the protective committee to do so at once. In April, 1916, application was made to the Court for an order directing an inquiry into the transactions involving the stock of the United Traction Company and the reasons for the discontinuance of the payment by the Pittsburgh Railways of the 5 per cent dividend on the United Traction Company stock. At the hearing on this application the management of the United Traction Company denied that the net earnings of the company were

large enough to pay fixed charges and a dividend of 5 per cent on the preferred stock and to show a surplus to the credit of the company if proper allowances were made for maintenance, etc.

Railways Company General, New York, N. Y.—At the annual meeting of the Railways Company General on Feb. 19 the retiring directors were re-elected with the exception of William H. Crook, whose place was filled by Evans R. Dick, Jr.

Reading Transit & Light Company, Reading, Pa.—The Reading Transit & Light Company, which is controlled by the Eastern Power & Light Corporation, has filed with the Pennsylvania Public Service Commission a petition for the purchase of the controlling interest in the United Traction Company. The Metropolitan Electric Company, controlled by the United Traction Company, has asked for permission to acquire the Edison Electric Illuminating Company and the Lebanon Valley Electric Light Company, both of Lebanon, Pa. The consolidation of the companies is a step in the direction of preparing for the further development of the street railway and electric power service in Reading and the Lebanon Valley, in accordance with the plan noted in the ELECTRIC RAILWAY JOURNAL of Feb. 10, page 267.

Seattle (Wash.) Municipal Railway.—According to figures by A. L. Valentine, superintendent of the Department of Public Utilities, Division "A" and Division "C," which constitute Seattle's municipal railway system, were operated from June 1, 1914, to Feb. 1, 1917, at a loss of $100,672, or an average for the entire period of $3,146 a month. Losses for January were $2,290. Of this loss, $528 is charged to Division "A," $1,593 to interest on Division "A" bonds, and $168 to operating loss on the Lake Burien line.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—It is stated that 8000 of the 11,200 shares of the common stock of the Sherbrooke Railway & Power Company have been deposited under the exchange plan with the Southern Canada Power Company. The terms of the exchange were published in the ELECTRIC RAILWAY JOURNAL of Jan. 13, page 92.

Southern Cambria Railway, Johnstown, Pa.—The Southern Cambria Railway has been placed in the hands of the Cambria Trust Company, Johnstown, Pa., as receiver. This action is understood to be the direct outcome of a serious wreck on the road on Aug. 12, 1916. Shortly after the accident the railway was placed in the hands of James P. Thomas as trustee.

Third Avenue Railway, New York, N. Y.—The directors of the Third Avenue Railway have ordered payment of the full six months' interest, due on April 1, on the adjustment income 5 per cent bonds.

Toronto (Ont.) Railway.—At the annual meeting of the Toronto Railway on Feb. 7, George H. Smithers, Montreal, and Frank W. Ross, Quebec, were elected directors of the company to succeed W. D. Matthews and James Gunn, resigned.

Toronto (Ont.) Civic Railway.—The Toronto Civic Railway was operated by the municipality at a profit of $27,569 during 1916. The balance over operating expenses during 1915 was $10,459. The city operates the lines in the newer portions of the city, where the Toronto Railway has not been extended. The fares for adults are six tickets for 10 cents. Children are carried at half fare. More than 800,000 soldiers in uniform were carried free during 1916, as against about 187,000 during 1915.

Washington Water-Power Company, Spokane, Wash.—Although the number of car miles for 1916 exceeded those of 1915 by 53,000 and the car hours run showed an increase of more than 6000 over those of the previous year, the number of passengers carried by the Washington Water Power Company in Spokane, Wash., during 1916 decreased 112,903 as compared with the corresponding figure for 1915. This statement is made in a report recently submitted to the company's stockholders, which blames jitney competition for the decrease. The total net earnings during the year were $586,962. Total dividends of 4½ per cent were paid. Extensions and betterments amounted to $320,833, and the total assets at the close of the year were $27,360,058.

Dividends Declared

El Paso (Tex.) Electric Company, quarterly, 2½ per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1 per cent, common.

Sheboygan (Wis.) Electric Company, quarterly, 1¾ per cent, preferred.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Dec.,		'16	$20,204	*$7,084	$13,120	$3,555	$9,565
1 "	"	'15	18,055	*8,354	9,701	3,175	6,526
12 "	"	'16	211,694	*100,858	110,836	42,003	68,833
12 "	"	'15	190,852	*108,205	82,647	26,946	55,701

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Dec.,		'16	$8,788	*$9,185	†$397	$1,121	†$1,518
1 "	"	'15	8,145	*8,318	†173	1,113	†1,286
12 "	"	'16	122,614	*109,113	13,501	13,286	215
12 "	"	'15	115,207	*96,433	18,774	13,493	5,281

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Dec.,		'16	$40,284	*$22,346	$17,938	$6,552	$11,386
1 "	"	'15	36,267	*19,625	16,642	6,536	10,106
12 "	"	'16	393,666	*231,265	162,401	78,327	84,074
12 "	"	'15	357,214	*206,428	150,786	79,172	71,614

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Dec.,		'16	$1,733,278	*$972,807	$760,471	$420,273	$340,198
1 "	"	'15	1,475,889	*760,857	715,032	405,890	309,142
12 "	"	'16	16,962,607	*9,276,038	7,686,569	5,034,827	2,651,742
12 "	"	'15	14,590,124	*7,788,455	6,801,669	4,506,082	2,295,587

GALVESTON-HOUSTON (TEX.) ELECTRIC COMPANY

1m., Dec.,		'16	$176,496	*$109,857	$66,639	$36,859	$29,780
1 "	"	'15	163,212	*106,445	56,767	36,597	20,170
12 "	"	'16	1,944,839	*1,236,107	708,732	438,993	269,739
12 "	"	'15	1,936,228	*1,206,457	729,771	433,308	296,462

GRAND RAPIDS (MICH.) RAILWAY

1m., Dec.,		'16	$119,184	*$61,871	$57,313	$17,740	$39,573
1 "	"	'15	112,010	*74,316	37,694	12,475	25,219
12 "	"	'16	1,297,586	*828,025	469,561	186,919	282,642
12 "	"	'15	1,176,450	*832,799	343,651	165,187	178,464

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Dec.,		'16	$29,777	*$15,081	$14,697	$5,240	$9,457
1 "	"	'15	26,887	*12,091	14,796	5,522	9,274
12 "	"	'16	326,398	*186,459	139,939	63,916	76,023
12 "	"	'15	276,660	*157,537	119,123	66,517	52,606

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Dec.,		'16	$62,300	*$38,149	$24,151	$15,552	$8,599
1 "	"	'15	53,618	*36,772	16,846	14,736	2,110
12 "	"	'16	627,193	*423,707	203,486	183,907	19,579
12 "	"	'15	611,568	*428,839	182,729	177,898	4,831

KEOKUK (IOWA) ELECTRIC COMPANY

1m., Dec.,		'16	$21,456	*$14,411	$7,045	$2,063	$4,982
1 "	"	'15	21,069	*12,481	8,588	1,859	6,729
12 "	"	'16	240,181	*160,855	79,326	23,626	55,700
12 "	"	'15	232,593	*151,156	81,437	22,400	59,037

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Dec.,		'16	$182,357	*$101,221	$81,136	$28,597	$52,539
1 "	"	'15	156,940	*93,912	63,028	29,250	33,778
12 "	"	'16	1,930,320	*1,157,078	773,242	346,929	426,313
12 "	"	'15	1,713,213	*1,049,709	663,504	330,817	332,687

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Dec.,		'16	$26,843	*$14,657	$12,186	$7,664	$4,522
1 "	"	'15	23,935	*13,008	10,927	6,884	4,043
12 "	"	'16	280,100	*157,336	122,764	92,675	30,089
12 "	"	'15	258,041	*146,819	111,222	85,705	25,517

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Jan.,		'17	$2,427,787	$1,385,416	$1,042,371	$813,804	$228,567
1 "	"	'16	2,153,920	1,200,538	953,382	816,777	136,605
7 "	"	'17	16,284,933	9,089,236	7,195,697	5,701,037	1,494,660
7 "	"	'16	14,570,892	8,160,473	6,410,419	5,712,571	697,849

TAMPA (FLA.) ELECTRIC COMPANY

1m., Dec.,		'16	$91,444	*$45,504	$45,940	$4,368	$41,572
1 "	"	'15	85,769	*44,325	41,444	4,345	37,099
12 "	"	'16	967,086	*527,719	439,367	52,414	386,953
12 "	"	'15	981,049	*502,901	478,148	52,343	425,805

*Includes taxes. †Deficit.

Traffic and Transportation

Jitney Regulation More General

Nearly All Pacific Coast Cities Have Ordinances with Restrictive Provisions

Practically all of the cities of the Pacific Coast have adopted jitney ordinances with more or less restrictive provisions. The terms of the ordinances vary between wide limits, as does the rigidity with which the ordinances are enforced, but in certain fundamentals the majority of the measures enacted by the municipalities correspond. For example, definite routes are prescribed on which the buses must operate, making complete trips before turning. Bonds or insurance policies are required, the minimum liability ranging from $5,000 to $10,000. The license fees are assessed on various bases and vary from $10 to $60 per car per annum.

In San Francisco and, in fact, in most of the larger cities, the regulation of the buses is in the hands of the police department. In Los Angeles, on the contrary, the drafting and the enforcement of special traffic regulations for jitney buses is now in the hands of the Board of Public Utilities, whence it was transferred from the Police Department. Since this transfer a material improvement in traffic conditions is claimed to have been effected.

Unique among the plans under which jitney buses operate on the Pacific Coast is the franchise scheme in effect at Long Beach, Cal., where a carefully drawn up franchise was sold to the highest jitney bus bidder, as outlined in the ELECTRIC RAILWAY JOURNAL for Dec. 9, 1916. There has not yet been opportunity to study operating conditions under the franchise plan because the independent jitney drivers of Long Beach secured injunctions preventing the city from excluding them from streets on which the exclusive franchise was granted. The case is now being tried and meanwhile the independent jitneys are operating.

In at least six Pacific Coast cities the traction companies have put on motor buses of their own for auxiliary service in competition with or after the exclusion of the privately owned jitneys. At first some of these buses cost the companies considerably more than they took in in fares, but in recent months there has been some change in this situation. Although definite figures are not yet available, traction company officials have stated that the auxiliary service is a success in serving outlying districts. This is true particularly where the company is granted the exclusive right to operate such service.

Spokane One-Man Cars Approved

Arthur A. Lewis, chairman of the Public Service Commission of the State of Washington, and J. F. Reardan, inspector, recently inspected the lines of the Washington Water Power Company and the Spokane & Inland Railroad in Spokane, in reference to their use of one-man cars. They have approved the use of the cars on some of the lines of the Washington Water Power Company. The cars operated by the company are built according to the commission's recommendation, except that the knob on the emergency door at the back must be placed lower down. Permission to use the one-man cars is made conditional upon the use of two men on the cars during the rush hours. The Spokane & Inland Empire Railroad is now operating a one-man car on the Rockwood line, which is approved by the commission. Other lines of this company will be inspected for approval as soon as that company has cars to operate. In the case of the city of Spokane against the companies the Public Service Commission, as noted in the ELECTRIC RAILWAY JOURNAL for Jan. 27, page 184, decided that the companies should submit for the approval of the commission lists of routes on their respective lines upon which they desired to operate one-man cars and that such cars be inspected and approved by the commission before operation.

Hearing on Buffalo Service

Public Service Commissioner Will Recommend Survey of Traffic Conditions

Unusual interest was taken in the public hearing held in Buffalo, N. Y., on Feb. 17, before Public Service Commissioner Devoe P. Hodson of the Second District on complaints against the International Railway for alleged inadequate service. At the conclusion of the hearing, Commissioner Hodson announced that he would recommend to the commission that Charles R. Barnes, its traffic expert, make a survey of conditions in Buffalo and report his recommendations to the commission. The railway was represented by Edward G. Connette, president; E. J. Dickson, vice-president; Nelson H. Brown, general superintendent of transportation; T. W. Connette, superintendent of Buffalo city lines, and Thomas Penney, general counsel.

Almost every witness who appeared before Commissioner Hodson severely criticized union platform employees of the company and scores of suggestions were made for re-routing lines through the congested down-town business district; more efficient handling of workers in the north-end industrial centers and better lighting in the cars.

Explaining the causes of traffic delays during the last four months, Mr. Connette declared that an unusual amount of snow had fallen and that it has been a physical impossibility to remove the snow from the city streets. He produced figures to show that more than 60,000,000 cu. ft. of snow should be moved away in order to facilitate traffic and he called attention to the fact that if every vehicle was pressed into service it would take at least four months continuous work to remove this vast amount of snow. He told of an agreement between the city and the company whereby the city is to remove the snow and the company agrees to pay one-third of the cost.

Answering other complaints against the company's service, Mr. Connette told Commissioner Hodson that the company has under consideration plans for re-routing, thereby preventing congestion and over-crowding. He told Commissioner Hodson that the company has placed an order for fifty new cars of the most approved type, but they cannot be delivered until August. Thirty-two new cars are due immediately. A year ago the company had 568 cars in operation and 143 cars in reserve. At present the company has 667 cars in operation, forty-five of which are used exclusively by employees of the Pierce-Arrow motor plant.

David C. Howard, vice-president of the Buffalo Chamber of Commerce, made the following statement:

"At a meeting of the board of directors of the Chamber of Commerce, held on Feb. 13, the president submitted a message which authorized the formation of a special committee to investigate the street railway situation. Until this committee has had an opportunity to make its investigations and arrive at its conclusions, the chamber is in no position as an organization to submit complaints, but we wish at this time to have our presence recorded."

Petition for One-Man Cars

The Puget Sound Traction, Light & Power Company, Seattle, Wash., has petitioned the Council for authority to operate one-man cars on all lines where it is deemed advisable. The petition has been referred to the franchise committee of the Council. It reads as follows:

"Your petitioner has given much consideration to the subject of operating a safe and comfortable light car, which can be easily and safely run by one man. Your petitioner is ready to adopt cars of such character. It is now operating with entire satisfaction one such car on the Bellevue-Summit line in Seattle. If your petitioner should put a number of such cars in operation in Seattle, it would be enabled to give more expeditious and frequent service upon various lines. In order for it to purchase and put into use a considerable number of such cars, your petitioner prays that you enact an ordinance permitting the use of such cars generally throughout the city, so that your petitioner may, wherever it is advisable to use such cars, proceed to put them into service. Your petitioner submits herewith a Council bill, which it respectfully prays your honorable body to enact as an ordinance."

Abandonment Petition Denied

Commission Refuses to Upset Contractual Relation, Claiming Intervention Is Not Needed in Public Interest

Upon an opinion by Commissioner Emmet the Public Service Commission of the Second District of New York has denied the petition of the Freeport Railroad to cease the operation of its electric railway between the railroad station at Freeport, L. I., and the ferry during the winter months. The application is denied upon the grounds that though under a recent decision of the Appellate Division of the Supreme Court of New York the commission is held to have the power to modify franchise requirements as to fares, etc., this newly found power should be employed with great care. Mr. Emmet finds that in the present case the village board has expressly refused to modify the franchise requirement which compels the railroad to operate six trips a day in winter; that there is evidence that many people in Freeport and some transients would be inconvenienced by the discontinuance of this winter service, and that though past experience of the railroad produces figures which show the winter operation to have been unprofitable, Freeport is a growing community in which the winter business of the company may well improve.

In discussing the decision of the Appellate Division in the case of the New York & North Shore Railroad, referred to in the ELECTRIC RAILWAY JOURNAL of Feb. 3, pages 195 and 210, Mr. Emmet says that before this decision it was generally held that the commission had no power to modify the conditions of a franchise, and finds that the North Shore reasoning, though concerning rates of fare in franchises, must also be taken to extend to service matters. He says:

"Apparently we have the right to grant an application of this sort. We feel, however, that the circumstances surrounding this case are somewhat different from those which ordinarily accompany appeals to the Public Service Commission to employ discretionary powers which it has long been recognized to possess, and for the wise exercise of which it was in large part created. In this case the power we are asked to exert must be regarded as having been placed in our hands not so much by the deliberate action of the Legislature as by a more or less 'advanced' decision of the Supreme Court. And certain rather unusual complications exist in respect to the use which we are asked to make of our newly discovered powers. It is proposed that we shall upset what has always been regarded as a contractual relationship, against the will of one of the contracting parties. We are asked to reverse the judgment of another governmental body which until recently was supposed to be the only one which had any jurisdiction over this particular matter."

Mr. Emmet concludes that such powers should be exercised only when there is the "strongest evidence that our intervention is necessary in the public interest." He does not find such evidence in this case.

Traffic Survey Urged in Harrisburg

Demands for a survey of electric railway traffic in Harrisburg, Pa., are being made by the Harrisburg *Telegraph*. Under date of Feb. 17, that paper printed an editorial which is of interest as showing the viewpoint of the disinterested newspaper toward the street railway problem. The editorial does not blame the company. It merely wants things straightened out, and says: "The average citizen has no feeling either for or against the railway as such. He wants prompt and efficient service for his nickel, and beyond that he is not greatly interested."

Interviewed by the Harrisburg *Telegraph* on Feb. 19, Frank B. Musser, president of the Harrisburg Railways, declared that personally he favored such a survey as suggested, and stated he believed the board of directors would do the same. Mr. Musser was quoted in part as follows:

"We are interested in seeing what results are accomplished by those surveys. If anything of importance is accomplished by the work there we may take the matter up. We shall be guided largely in our decision by these reports.

"We are making every effort to work out our problems and are glad to receive suggestions from persons not connected with the company. More demands are made on the service now than in past years. Business has been greater every place than ever before and we have every car on wheels in operation in an effort to avoid congestion and crowded cars. General conditions are such that we cannot get new cars. Generally the company orders six or seven each year. This time we ordered ten, but we cannot get the deliveries through. The manufacturers have promised to try to get five of them to us by Memorial Day."

Safety-First Checks Distributed in San Diego.—Savings from the San Diego (Cal.) Electric Railways 1916 accident fund of $13,651, made possible by the work of its platform men in preventing accidents during the past year, were distributed on Jan. 31 by M. J. Perrin, superintendent of the company.

Interurban Benefit Association Prospering. — The Union Traction Mutual Benefit Association, organized among the employees of the Union Traction Company, Anderson, Ind., has now over 700 members on its rolls and the number is rapidly increasing. The Union Traction Company has guaranteed the payment of all benefits, and is furnishing free to the employees the services of its officers and the use of its offices.

Eastern Representatives Attend Western Stone & Webster Club.—The mid-winter meeting of the Stone & Webster Club of Washington at Seattle was dignified on the night of Jan. 26 by the presence of a member of the firm of Stone & Webster and several Eastern officials connected with the Boston organization. Edwin S. Webster, who had been in Seattle since the previous Sunday evening, was accompanied by F. S. Pratt, vice-president of the Stone & Webster Management Association and chairman of the board of the Puget Sound Traction, Light & Power Company, and D. P. Robinson, president, and G. O. Muhlfeld, manager, of the Stone & Webster Engineering Corporation.

United Traction Transfer Privileges to Be Withdrawn.—Upon the ground that the present tariffs of the United Traction Company, Albany, N. Y., effect an inequality between city passengers and those using the city and interurban lines, the Public Service Commission of New York, Second District, has permitted the company to put into effect on Feb. 25 its new tariffs withdrawing the transfer privileges to and from the Albany-Troy and Albany-Cohoes interurban lines and the city lines in all three cities. The company has announced that it will increase local service to take care of traffic heretofore carried on the interurban cars for points within the city lines, so that the transfer privilege within the cities will not be materially changed. The opinion of the commission, written by Commissioner James O. Carr, points out that under the present schedule city passengers in Troy are carried an average of 2 miles for 5 cents and in Albany 1.4 miles for 5 cents, while the interurban passengers using transfers under the present transfer system average probably more than 5 miles for 5 cents.

Serious Grade Crossing Accident in Louisville.—The most serious accident of years in Louisville, Ky., on Feb. 12, when a Southern Railway freight engine struck a loaded West Broadway car of the Louisville (Ky.) Railway at the Thirtieth Street grade crossing, has resulted in a general and apparently determined agitation in that city for elimination of grade crossings. There were four persons killed in the crash and thirty-seven more or less badly injured, several of whom are not expected to recover. According to best information obtainable, the car made the safety stop at the crossing; the motorman looked both ways; the conductor, seeing the gates up, gave the signal and the freight locomotive struck the car in the midd'e as it was crossing the rails. The accident occurred after dark and there is a difference of statements as to whether or not the railroad engine had a headlight lighted. The towermen were just changing watch and the bell was not sounded until the street car was on the track. One board of the City Council has adopted a resolution calling on the Louisville Railway to furnish a man to ride on cars and at the crossings of the steam railroad tracks to get off and make sure that no train is approaching.

Personal Mention

A. H. MacAdams has been elected president of the Slate Belt Electric Railway, Pen Argyl, Pa.

Dr. O. D. Schaffer has been elected secretary of the Slate Belt Electric Railway, Pen Argyl, Pa.

Thomas J. Ryan has been elected treasurer of the Slate Belt Electric Railway, Pen Argyl, Pa.

Frank Lugar has been appointed superintendent of the Shamokin & Edgewood Electric Railway, Shamokin, Pa.

Charles Herrick has been appointed master mechanic of the Reading Transit & Light Company, at Lebanon, Pa.

Perry Trimble has been elected secretary and counsel of the Chicago, Aurora & De Kalb Railroad, Aurora, Ill.

Earl Partrick has been appointed master mechanic of the San Francisco, Napa & Calistoga Railway, Napa, Cal.

W. H. Grimes has been appointed local superintendent of the Central Illinois Public Service Company, Anna, Ill.

R. L. Aage has been appointed general auditor of the American Public Utilities Company, Grand Rapids, Mich.

J. T. Kemp has resigned as general superintendent of the Sherbrooke Railway & Power Company, Sherbrooke, Que.

H. H. Lunsford has resigned as superintendent of the Southwestern Traction & Power Company, New Iberia, La.

F. X. Couture has been appointed railway superintendent of the Sherbrooke Railway & Power Company, Sherbrooke, Que.

F. C. Chisholm has been appointed power superintendent of the Sherbrooke Railway & Power Company, Sherbrooke, Que.

Charles O. Murphy has been appointed assistant general manager of the American Public Utilities Company at Grand Rapids, Mich.

M. B. Wheeler will be appointed commercial agent of the American Public Utilities Company, Grand Rapids, Mich., effective March 1, 1917.

T. A. Darrow has been appointed chief dispatcher of the Columbus-Dayton division of the Ohio Electric Railway to succeed W. L. Clayton.

L. B. Andrus has been appointed chief engineer of the American Public Utilities Company, Grand Rapids, Mich., succeeding B. T. Gifford.

F. G. Houser, formerly secretary-treasurer and auditor of the Boise Valley Traction Company, Boise, Idaho, will succeed H. F. Dicke as general manager.

J. G. Bouris, auditor of the Everett (Wash.) Gas Company, will succeed Ray Ballard as auditor of the Ottumwa Railway & Light Company, Ottumwa, Iowa.

G. E. Barber, assistant superintendent of the Columbus-Dayton division of the Ohio Electric Railway, has resigned. He has been with the company twelve years.

A. T. Longhurst has been been appointed general foreman of the Stamford shops of the New York, New Haven & Hartford Railroad, in charge of steam and electric equipment.

C. B. Jones has been appointed manager of the railway department, in addition to his duties as claim agent, of the Montgomery Light & Traction Company, Montgomery, Ala.

Roy Ballard, auditor of the Ottumwa Railway & Light Company, Ottumwa, Iowa, has been appointed auditor of the Fort Smith Light & Traction Company, Fort Smith, Ark.

C. H. Still has resigned as purchasing agent of the Pacific Power & Light Company, Astoria, Ore., to become purchasing agent for the Valley Mills purchasing bureau in Portland.

Alex Newhouse, for several years division shop foreman at Muncie, Ind., for the Union Traction Company, has resigned to accept a similar position with the Evansville (Ind.) Railways.

W. W. Waterson, of the Illinois Traction System, has been appointed superintendent of transportation of the Chicago, Ottawa & Peoria Railway and transferred to Ottawa, Ill., as headquarters.

Frank W. Brooks, president and general manager of the Detroit (Mich.) United Railway, has left on a two-months trip to California and Honolulu. He is accompanied by his wife and daughter.

Fred Connelly, formerly division man at New Castle, Ind., for the Union Traction Company of Indiana, has been appointed division foreman of the same company at Tipton, succeeding Alex Newhouse.

W. L. Clayton has been appointed assistant superintendent of the Columbus-Dayton division of the Ohio Electric Railway to succeed G. E. Barber. Mr. Clayton has been chief dispatcher for some years.

Samuel Riddle, superintendent of transportation of the L uisville (Ky.) Railway Company, has been elected a director of the Louisville Transportation Club, an organization of shippers and traffic men of that city.

Robert A. Smith, for a number of years master mechanic of the Shreveport (La.) Traction Company, has been appointed master mechanic of the Southwestern Traction & Power Company, succeeding H. H. Lunsford.

Ward Hubbard is assistant engineer, maintenance of way, Bay State Street Railway, Boston, Mass., and not engineer, maintenance of way, as stated in last week's issue. David Curtin is still engineer, maintenance of way.

J. H. Morris, formerly chief dispatcher of the Illinois Traction System, has been appointed superintendent of the Peoria Division of the St. Louis, Springfield & Peoria Railroad, with headquarters at Mackinaw Junction, Ill.

B. W. Arnold, who has resigned as superintendent of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has been transferred to Peoria as secretary to H. C. Chubbuck, vice-president executive of the Illinois Traction System.

R. A. Riley has resigned as superintendent of equipment of the Birmingham Railway Light & Power Company, Birmingham, Ala., to accept a position with the sales staff of the Western Electric Company. He will travel in Alabama.

G. H. Losey, superintendent of maintenance of way of the railway electrical department of the Indiana Railways & Light Company, Kokomo, Ill., has been made electrical engineer in charge of the company's railway and lighting department.

P. W. Kurr, Lebanon, Pa., has been appointed cashier of the Reading Transit & Light Company, succeeding H. B. Daugherty, whose resignation took effect on Feb. 1. Mr. Kurr has been in the employ of the company as assistant cashier for two years.

P. H. Palmer, who for several years has been assistant general manager and electrical engineer of the Indiana Railways & Light Company, Kokomo, Ind., has been appointed general superintendent of the company to succeed T. C. McReynolds.

John A. Barhite, Special County Judge of Monroe County, New York, has been nominated by Governor Whitman as the successor to Devoe P. Hodson, on the New York Public Service Commission, Second District. The nomination has been sent to the Senate for confirmation.

Daniel J. Haren has resigned as general superintendent of the Syracuse & Suburban Railway, Syracuse, N. Y., to assume an important position in the transportation department of the Buffalo, Lockport & Rochester Railway of which Allen & Peck, Inc., are operating managers.

Charles Currie, whose resignation as vice-president and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, was recently announced in the ELECTRIC RAILWAY JOURNAL, has been elected president of the London (Ont.) Street Railway, succeeding E. W. Moore.

George W. Knox, second vice-president and general manager, Oklahoma Railway, Oklahoma City, Okla., has resigned, effective May 1. The directors of the company gave him a certified copy of resolutions, thanking him for his able services to the company through dull times, and expressing regret at his departure. It is understood Mr. Knox will return to Chicago to resume active work in business interests which he left to take charge of the Oklahoma company in 1911.

James F. Hamilton, general manager of the Schenectady (N. Y.) Railway, has been appointed general manager of the New York State Railways, Rochester Lines, succeeding E. J. Cook. Mr. Hamilton, who has been a prominent figure in the electric railway field, entered the transportation department of the International Railway, Buffalo, in 1896, and after serving in various positions was placed in charge of one of the largest stations. He resigned his position with that company in 1902 to become assistant superintendent of the Schenectady Railway and was appointed superintendent of the company in 1909. In 1911 Mr. Hamilton was engaged as general superintendent of the United Traction Company, Albany, and was retained by the Schenectady Railway in an advisory capacity, and in 1912 he was appointed general manager of both companies, in which capacity he continued until 1914, when he relinquished his connection with the United Traction Company. Mr. Hamilton has been active in the work of the New York Electric Railway Association for a number of years, and has served on the executive committee, as vice-president and as president in 1914.



JAMES F. HAMILTON

Thomas H. McGarry, for the past six years connected with the Bay State Street Railway, Boston, Mass., has been appointed purchasing agent of the company. Mr. McGarry started with the company at its Woburn office as stock clerk. At a later date he was transferred to the transportation department.

E. J. Cook, general manager of the New York State Railways, Rochester Lines, has been appointed chief engineer of all lines of this system, which include the city lines in Rochester, Syracuse, Utica and Schenectady, the third-rail line between Syracuse and Utica, and half of the interurban line between Schenectady and Albany. Mr. Cook was born in Springfield, Ohio, in 1865. After a preliminary education in the schools of this city he prepared for an engineering career at the Stevens Institute of Technology, graduating in 1886. He was engineer of construction and later superintendent of the Brooklyn Edison Company, and was vice-president of the Field Engineering Company, New York, during the period when many electric railway and lighting properties were designed and equipped, the railways changing from horse to electric cars. In 1895 he became active in the reconstruction and development of the Detroit (Mich.) Railway, and in 1896 he was appointed electrical engineer of the Cleveland (Ohio) Electric Railway, and five years later electrical engineer of the Cleveland City Railway. When these two properties were consolidated in 1903, Mr. Cook became electrical engineer of the entire system, remaining until 1907, when he was sent to Rochester, N. Y., as general manager of the Rochester Railway and the subsidiary electric railway companies in that vicinity, which later became consolidated into part of the New York State Railways. Mr. Cook is particularly well adapted for his new engineering position as he is pre-eminently an engineer with a keen ability to analyze problems by means of applied mathematics. He has been successful in utilizing this talent to advantage, even in the inexact field of transportation, where his studies in connection with trailer operation are especially noteworthy.



E. J. COOK

W. R. Barlow, formerly with the New York State Railways, Syracuse-Utica Lines, has recently been appointed to the position of assistant electric engineer with the Public Service Commission for the First District, New York. Mr. Barlow is a graduate of the Pennsylvania State College, class of 1909, and for five years after graduation had been with the General Electric Company in the railway engineering department.

J. E. Bassett has been elected secretary of the Dallas (Tex.) Northwestern Traction Company, which has arranged to build an electric railway from Dallas to Slidell, a distance of 60 miles. Mr. Bassett has been connected with the Texas & Pacific Railroad for more than thirty years and for the last twenty years has had charge of the purchasing department of the road under J. W. Everman and L. S. Thorne at Dallas, Tex.

Obituary

Maj. E. C. Lewis, formerly a co-receiver of the Nashville Railway & Light Company, Nashville, Tenn., is dead. Major Lewis was a well-known civil engineer and was also a publisher of the Nashville *Daily American* and a chairman of the board of directors of the Nashville, Chattanooga & St. Louis Railroad.

James Leitch, of the Supreme Court of Ontario, died on Feb. 8 at his home in Toronto. Mr. Leitch was the first chairman of the Ontario Railway & Municipal Board, from the time of its creation by the Ontario government in 1906 until his appointment to the Supreme Court in 1912. He was born in South Branch, Ont., and practised law for many years at Cornwall, Ont., until his appointment as chairman of the railway board. He was sixty-six years of age.

Edward Johnson, division superintendent of track and roadway, Chicago (Ill.) Surface Lines, died on Jan. 3 after a short illness. Mr. Johnson was born in Sweden, and was first employed in street railway work by the Western Chicago Railroad in 1893, which operated on the West Side in that city. He began work as a mechanic on the old Madison Street cable line, and was later promoted to assistant foreman, then foreman, and general foreman. In 1906 he was made assistant roadmaster of the Chicago Union Traction Company, and on Feb. 1, 1914, was made division superintendent of track and roadway, the position held at the time of his death.

John J. Burleigh, vice-president of the Public Service Corporation of New Jersey, Newark, N. J., and president of the Broadway Trust Company, Camden, N. J., died on Feb. 18 at his home in Merchantsville, in his sixty-third year. Mr. Burleigh rose to his late position of influence through a long series of activities in the utility and financial fields. At the age of fourteen, after a course in the public schools of Salem, he began the study of telegraphy. A year later he entered the service of the West Jersey & Seashore Railroad as station agent. While he was only eighteen Mr. Burleigh was made chief telegraph operator of the railroad and its leased lines. In 1883 he became assistant trainmaster and five years later trainmaster. Leaving the company in June, 1892, he started upon a series of successful utilities promotion enterprises, most of which were in South Jersey. He gave the city of Camden its first electric car, first telephone and first electric light. A telegraph line between Bridgeton and Port Norris was built by Mr. Burleigh in 1892, and a line from Woodbury to Penns Grove a year later. Other large operations were the Eastern Telephone Company, now a part of the Keystone system, and the Camden Lighting & Heating Company, which was taken over in 1903 by the Public Service Corporation. Until 1908 Mr. Burleigh continued as the Public Service executive in the Camden field. At that date he became a director and was soon made second vice-president, dividing his activities between the Camden and the Newark offices. His touch with Public Service employees was close. He was chairman of the public relations committee of the corporation and its subsidiaries, and took charge of the welfare work of the company from its inception in 1911. Mr. Burleigh had many other business interests and he had a large share in promoting the development of Camden. He is survived by seven children.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

*Coal District Power Company, Fort Smith, Ark.—This company has just been organized at Fort Smith and incorporated under the laws of Arkansas for the purpose of constructing and operating electric street railway and interurban lines, and the production and distribution of electric current for light, heat and power. The company is capitalized at $120,000, of which $100,000 is common and $20,000 is 6 per cent preferred. Incorporators: L. A. Petit, Jr., L. E. Turner, G. W. Skow, Hugh Means and Albert Emmanuel. Officers of the company are: Hugh Means, president; G. W. Skow, vice-president, and L. E. Turner, secretary-treasurer. Headquarters will be maintained in Fort Smith. The organization of this company is the outgrowth of a recent visit to Fort Smith of Albert Emanuel, Schwind Building, Dayton, Ohio. Mr. Emanuel now controls traction lines in Lawrence and Parsons, Kan.; Fort Sheridan, Wyo., and Greenville, Tex. The company has taken option on the lighting plants in Greenwood, Huntington, Mansfield, Hartford and Booneville, and it is stated that these plants will be consolidated and all these towns will be connected by an interurban line.

FRANCHISES

Batavia, Ill.—By arrangement with the City Council the Aurora, Elgin & Chicago Railroad is to pay the city of Batavia $15 daily for a twenty-four-hour franchise, and the boycott of the city on that road has been ended. Trains now operate through the city.

South Hadley Falls, Mass.—The Holyoke Street Railway will receive a franchise from the City Council to construct an extension along West Main Street, to Canal, to Maple, to Taylor, to North Main Street.

Eastwood, N. Y.—The New York State Railways has asked the Council for a franchise to construct a loop in Eastwood.

New York, N. Y.—The Manhattan & Queens Traction Corporation has received a six months' extension of time on its franchise to construct an extension on Central Avenue to Springfield Avenue, St. Albans.

Bartlesville, Okla.—It is reported that the Oklahoma & Northern Traction Company, which proposes to construct an electric railway from Bartlesville to Miami, has received a franchise from the City Council of Bartlesville. W. K. Palmer & Company, Kansas City, Mo., engineers. [Jan. 13, '17.]

San Antonio, Tex.—The County Commissioners have granted the San Antonio Traction Company a permit to construct an extension along the Somerset Road from the city limits to Givens Avenue and thence on to South San Antonio, which is located about 6 miles south of the city hall.

Walla Walla, Wash.—The Walla Walla Railway Company recently applied to the Board of County Commissioners of Walla Walla County for a franchise to use a certain strip of land along Electric Avenue, in connection with the construction, maintenance and operation of side tracks.

TRACK AND ROADWAY

San Francisco, Napa & Calistoga Railway, Napa, Cal.—Another track, to provide better switching facilities, and in contemplation of increased freight traffic, will be laid by the San Francisco, Napa & Calistoga Railway from the foot of Georgia Street to the Monticello steamer wharf at the foot of Maine Street.

Attawaugan Street Railway, Danielson, Conn.—A committee consisting of Harry E. Back, William P. Kelley, Judge Sabin S. Russell, E. L. Darbie, Judge Oscar Atwood, Fred E. Bitgood and B. C. Hopkins, all of Danielson, appeared before the railroad committee of the General Assembly asking for an amendment to the charter of the Attawaugan Street Railway to allow a further extension of the proposed line beyond that contemplated in the original charter. The newly proposed line will start from Danielson, extending to Williamsville, Dayville, Attawaugan, Ballouville and Pineville. [Jan. 4, '13.]

Alton, Granite & St. Louis Traction Company, Alton, Ill.—The Public Utilities Commission of Illinois has rendered a decision which places the building of the extension to the line of the Alton, Granite & St. Louis Traction Company from the city limits of Alton to the site of the new State Insane Hospital in the hands of the Clark syndicate. The extension has been a matter of contention for two years.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—This company plans the rearrangement of its tracks through the southern part of the village of North Chicago, which will cut the number of curves from four within two blocks to two. Through the lengthening of the curve and elimination of reserve curves the cars will pass under the tracks of the Chicago & Northwestern Railway near the naval station depot on the east end.

Indiana Railways & Light Company, Kokomo, Ind.—At the annual meeting of the board of directors of the Indiana Railways & Light Company an appropriation of $300,000 to be expended this year in extending the street railway line and enlarging the power plant in Kokomo was approved.

Des Moines (Iowa) City Railway.—This company will construct a concrete viaduct at Twenty-fourth Street over High Street for the new Crocker Street car line. The structure will be about 175 ft. long and will cost about $5,000.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company will relocate its tracks from the south side to the center of Georgetown Street from Fourth Street to the city limits, preparatory to the improvement of that thoroughfare.

***Grand Rapids, Mich.**—The construction of an electric railway is being contemplated from Grand Rapids to Ludington and Manistee, via Sparta, Kent City, Ravenna, Fremont, Shelby and Hart. B. F. Barendsen, Grand Rapids, is interested.

Helena Light & Railway Company, Helena, Mont.—Improvements to the amount of $80,000 will be made by the Helena Light & Railway Company to its system in Helena this year. The proposed improvements include the installation of new ties and heavier rails on the East Helena line; the reconstruction of the upper Broadwater line to a great extent, and the addition of several new cars.

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission for the First District of New York has decided to reject the one bid received on Feb. 7 from Charles Meads & Company, New York, to cover the cost of the relocation of the trolley tracks in New Utrecht Avenue, Brooklyn, between Thirty-ninth and Eighty-first Streets. The commission is advertising for new bids to be received on March 5. The commission decided to reject the bid received from Charles Meads & Company on the report of its acting chief engineer, who stated that the amount of the bid, $223,220, was approximately $5,000 above the estimates of the cost of the work made by the commission's engineers. The commission will extend the time within which the work may be completed in the hope that considerably lower prices will obtain when new bids are opened.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has been informed by its engineers that both tubes of the land tunnel under Willoughby Street and Montague Street, Brooklyn, between the Flatbush extension and Clinton Street are now "holed through" to the shaft at Clinton and Montague Streets. The south tube of the tunnel was "holed through" on Jan. 30 and the north tube last week. Work was begun on both tubes of this tunnel on March 10, 1915, at Willoughby Street and Flatbush Avenue extension and work was prosecuted westward. The tunnel will cost approximately $2,000,000.

Great South Bay Ferry Company, Freeport, N. Y.—The Public Service Commission for the Second District of New York has denied the petition of the Great South Bay Ferry Company to cease the operation of its trolley line between the railroad station and the ferry during the winter months.

Buffalo, Rochester & Pittsburgh Railway, Rochester, N. Y.—Among the improvements planned by the Buffalo, Rochester & Pittsburgh Railway in the near future is the electrification of its Indiana branch.

Piedmont Railway & Electric Company, Burlington, N. C.—It is reported that surveys are being made by the Piedmont Railway & Electric Company for the construction of an extension to Hopedale, 3 miles.

Cleveland, Ohio.—City Engineer Hoffman is preparing plans and estimates for a city-built subway to care for all street railway traffic between West Twenty-fifth and East Fourteenth Streets. These have been ordered by the city administration, which has announced that it proposes to ask for a bond issue election to get funds to build the subway. The plan calls for a street railway terminal in Public Square with the city owning both the subway and the terminal and leasing them to the traction company.

Youngstown & Southern Railway, Youngstown, Ohio.—Announcement has been made that within a year the project of the extension of this company's line connecting Youngstown directly with East Palestine will be under way. The addition will call for a comparatively short line extending from Columbiana or Leetonia to the eastern terminal at East Palestine.

Ardmore (Okla.) Railway.—Surveys are being made by the Ardmore Railway for a few miles of city and suburban extensions.

Tulsa (Okla.) Traction Company.—The interurban railroad now being built by this company from Tulsa to Sapulpa will be in operation within ninety days, according to officials of the road. The line will then be extended south to Henryetta, traversing the great oil and coal fields of Oklahoma. The section of the line between Tulsa and Red Fork will be in operation in less than thirty days.

St. Catharines, Ont.—It is reported that a belt line around St. Catharines will be built in connection with the hydro-radial line to be constructed from Port Credit to St. Catharines.

Buffalo & Lake Erie Traction Company, Erie, Pa.—This company reports that it proposes to double-track a number of its single-track lines in Erie and will construct extensions into outlying territory. The company will also purchase additional equipment. The plan proposed will cover a period of five years, such extensions and double-tracking being made as are found necessary for the growth of the city.

Philadelphia, Pa.—Bids were opened Feb. 6 by the Department of City Transit of Philadelphia for the construction of the Delivery Loop Subway in Arch, Eighth and Locust Streets. The lowest bidders on the following sections were: Contract No. 201, Arch Street between Broad and Eighth Streets, including two stations, Keystone State Construction Company, Philadelphia, $1,575,760; contract No. 202, Eighth Street between Arch and Locust Streets, including one station, Smith, Hauser & MacIsaac, Inc., New York, $2,420,303; contract No. 203, Locust Street between Eighth and Broad Streets, including two stations, Keystone State Construction Company, $1,713,715. Awards of contracts are being withheld pending action by the Public Service Commission of Pennsylvania.

Chattanooga (Tenn.) Traction Company.—Operation has been begun by the Chattanooga Traction Company on its line from Chattanooga to Red Bank, 8 miles.

Waco-Beaumont Railroad, Beaumont, Tex.—At a recent meeting of the committee named by the Waco and Beaumont Chambers of Commerce, permanent organization of the board of control of the proposed Waco-Beaumont Railroad was formed. The following officers were elected: C. R. Walden, Beaumont, president; Abe Gross, Waco, vice-president; William Sanger, Beaumont, secretary, and E. W. Marshall, Waco, assistant secretary. The officers will arrange for a survey of the line, the route to be selected to be the shortest distance between Waco and Beaumont. [Oct. 23, '15.]

SHOPS AND BUILDINGS

Interborough Rapid Transit Company, New York, N. Y.—A two-story brick and terra cotta railroad station, containing stores and offices, will be constructed by the Interborough Rapid Transit Company at University Avenue near Jerome Avenue at a cost of about $40,000.

POWER HOUSES AND SUBSTATIONS

Georgia Railway & Electric Company, Atlanta, Ga.—Plans are being prepared by the Georgia Railway & Electric Company for the erection of four new substations in order to carry more evenly the increased city arc-lamp lighting load. The changes will call for the revision of all of the thirty-eight arc-lamp circuits, which will require new wires and poles, etc.

New Orleans Railway & Light Company, New Orleans, La.—This company is increasing its generating capacity and making important changes in its boiler plant. One 15,000-kw. General Electric turbo generator unit was installed in March, 1916, and a duplicate unit will be put in service by November, 1917. These units will generate 60-cycle, three-phase current at 6600 volts. The boiler installation, which is double-decked, consists of 900-hp. units installed seven on the first level and six on the upper level. By means of changes in the furnaces and by the installation of Westinghouse Underfeed stokers, it is planned to increase the boiler capacity so that, except at peaks, the boilers on the lower floor will probably be able to handle the entire present load. These boilers on the lower floor are coal-fired. The boilers on the upper floor are oil-fired. An important change that is being made in the boilers is the lowering of the floors to increase the size of the combustion chambers.

Bangor Railway & Electric Company, Bangor, Me.—This company will construct a transmission line from the Ellsworth, Veazie and Milford stations to the Eastern Manufacturing Company, Lincoln, with whom it has contracted to supply 2000 electric horsepower. About $75,000 will be spent in building the line.

Helena Light & Railway Company, Helena, Mont.—This company will construct a power line to the Scratch Gravel district to supply electrical power to the various mining companies operating in that section. The line will probably be built this fall.

Richmond Light & Railroad Company, New Brighton, N. Y.—Plans are being considered by the Richmond Light & Railroad Company, it is reported, for the erection of an aerial cable from Linoleumville to Lake Island over Fresh Kill Creek, to supply light and power service.

Piedmont Railway & Electric Company, Burlington, N. C.—Work has been begun by the Piedmont Railway & Electric Company extending its power lines to Elon College and Gibsonville.

Northern Ohio Traction & Light Company, Akron, Ohio.—Plans are being prepared for rebuilding the electric plant at Kent, which was recently taken over by the Northern Ohio Traction & Light Company. It is proposed to use the power house for a substation to distribute electricity for lamps and motors in Kent.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Plans have been completed by the Columbus Railway, Power & Light Company for the construction of a power house on the Hocking Valley Railway, 6 miles south of the city, to cost about $1,000,000. The Spring Street and Third Street stations will be closed and the plan of building on the bank of the Scioto River, just north of West Broad Street will be abandoned. It is stated that the company has already placed orders for a portion of the equipment for the proposed power house and that the right-of-way has been secured for the high-tension transmission lines into the city. It is expected that the station will be in operation some time during the coming fall.

Pacific Northwest Traction Company, Bellingham, Wash.—The City Council of Sedro Woolley is negotiating with the Pacific Northwest Traction Company for a new street lighting contract to cover a period of five years. Considerable changes will be made in the street lighting system if the contract is made.

Manufactures and Markets

Discussions of Industrial Conditions

A Department for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases | Business Announcements | Trade Literature

Buyers and Sellers Favor Uniform Catalog Size

Standardization Is Urged on the Basis of Conserving Printed Matter and Increasing Its Effectiveness

"Assurance has been given that a standardized catalog plan would have the support of most every wide-awake buyer and seller." This statement was recently made by W. L. Chandler, Dodge Manufacturing Company, Mishawaka, Ind., who also expressed his views on how catalogs and advertising literature could then be filed by the purchasing agent if published in uniform size by the manufacturer.

Mr. Chandler makes the prophecy that some generally-favored uniform catalog scheme will be in use before the end of five years. He urges attention to this subject because he believes a standardized catalog will reduce the cost of buying and selling.

"One of the biggest bugaboos of the buyer will then have vanished," he says. "He will no longer be compelled to find space in his files for an endless number of catalogs, price lists and data sheets ranging from single sheets of various sizes to bound books the size of a dictionary. All the data he possesses will be in one place. Tons of printed matter of possible interest to buyers for future reference will thus be saved from an untimely death via the waste basket route. Many circulars now escape the waste basket only when they pass through a buyer's hands at a time when he is in the market. After this prophecy shall have been realized, many of these will be saved by the buyers because they will have a place in which to file them conveniently for instant reference when occasion demands.

"A single standardized catalog of loose-sheet variety will furnish full information supplied by various sellers. This information will include price lists, weights, freight rates, discounts and any other data of value to the buyer. The standardized catalog has not as yet been adopted, but here is a method by which such a great time-saving device may and probably will be brought to a realization—perhaps in two yeafs.

How to Plan the Work

"This catalog should be worked out through the co-operation of all national trade, engineering and other associations, together with such local organizations as may care to lend assistance. This co-operation can perhaps best be secured through a conference board composed of representatives of the organizations interested. Such a conference board may formulate certain definite recommendations, outlining the proposed complete plan of operation of the standardized catalog. In such a conference board the best interests of all industries, from the standpoints of both buyer and seller, would be served. These recommendations may be ratified by the various organizations, and the catalog will then become a reality as soon as equipment can be installed and loose sheets prepared and distributed."

Mr. Chandler has worked out a definite plan for a standard master catalog file with loose sheets 8½ in. x 11 in., to be kept in standard vertical letter files and indexed according to the Dewey decimal system now used by large libraries. He points out that if this plan or any other plan recommended by a general conference board is accepted throughout the various industries a great economy in the production of advertising literature and a saving in the cost of space for its filing will result. Simple means are available for keeping such a file up to date. One item of waste under present conditions is the large catalog which applies only in part to the business of one buyer. Small sections of such books when filed in a standard master catalog file could usually cover the needs of any buyer.

The standard size for advertising matter and data sheets and catalog pages was proposed and was thoroughly discussed some years ago by the Central Electric Railway Association which adopted uniform sizes. However, so many of the manufacturers selling to the members of that association are interested to a far greater extent in other parts of the electric railway industry and in other industries that they found it inadvisable to change existing standards where these did not meet the standards laid down by the Central Electric Railway Association. At this time, however, Mr. Chandler through the National Association of Purchasing Agents and through contact with the executives of a great many engineering and trade associations, hopes to be able to give impetus to the movement for a standardized catalog.

Annual Report of The J. G. Brill Company

Sales Increase 40 Per Cent During 1916—Prospect of Increased Sales During 1917

The sales value of the combined output for the calendar year 1916 of all the plants of the J. G. Brill Company, Philadelphia, Pa., amounted to $6,180,895, as compared to $4,903,510 in 1914 and $4,403,116 in 1915. The increase for the last year was $1,777,779, or more than 40 per cent. The result of operation for 1916, after deducting $376,475 for maintenance and depreciation, was a net combined profit of $93,257. This, combined with the preceding surplus, left a net surplus on Dec. 30, 1916, of $1,146,193 after the payment $1,146,193 after the payment of $183,200 in dividends. The record of sales since 1907 is as follows:

1907	$9,211,825.72	1912	$7,842,090.68
1908	3,845,173.91	1913	9,154,433.79
1909	4,261,204.90	1914	4,903,510.70
1910	5,960,778.61	1915	4,403,116.72
1911	5,870,907.47	1916	6,180,895.79

According to the annual report of the company, the general business of electric car and car truck manufacturing had shown such improvement in the latter part of 1915 that the management at the beginning of 1916 hoped for a return to normal conditions during the year. The company, however, carried over into 1916 orders taken in the previous year at very low prices and upon estimates based on the then lower costs of labor and materials. While the demand for cars and car trucks improved during 1916, it was not nearly sufficient in volume to meet the normal capacity of all the concerns engaged in the industry, and consequently it did not lessen very materially the severity of competition. In addition, the cost of raw materials entering into production and used for maintenance, accompanied by the difficulty of obtaining prompt delivery at any price, and the great scarcity and continuous increase in the cost of labor throughout the year seriously affected the ability of the management to execute orders at satisfactory costs and within reasonable and profitable time.

The principal orders for projectiles on hand at the beginning of 1916 resulted in far less profit than the management anticipated, largely owing to the fact that the subcontractors, with whom the company had arranged for material and for machining and completing shells from forgings made by it, failed to meet their engagements. This resulted in the cancellation by the purchasers of the unfinished portions of these contracts. While settlements which the company was able to make gave some profit from this activity, it was not sufficient to affect materially the general results for the year. The management, however, made no serious expenditures in machinery or equip-

ment to engage in the manufacture of munitions, so that it has suffered no loss in the purchase of equipment fit only for such purpose.

On Feb. 9, 1917, the combined work on hand for cars, trucks, parts and miscellaneous material totaled $3,858,988, as compared to $2,058,918 the preceding year, while the work on hand for projectiles amounted to only $613,766, as compared to the preceding year's total of $2,741,197. The report states that there are prospects of increasing demands from electric railways during 1917.

Nominations for Federal Trade Board

President Wilson has sent to the Senate the nominations of former Governor Franklin Fort of New Jersey and William B. Colver of St. Paul, Minn., for the vacancies on the Federal Trade Commission created by the retirement of Edward N. Hurley and the fact that the Senate refused to confirm Commissioner Rublee, who has served for some time as a recess appointee, but who will not be nominated again.

Mr. Fort is a Republican, and resides at South Orange, N. J. He was born in that State in 1852, and is a graduate of Albany Law School, Rutgers College and New York University. From 1878 until the time he became Governor of New Jersey in 1908, in which position he served until 1911, Mr. Fort served on the judicial bench of New Jersey in various positions, ending with service on the Supreme Bench of that State.

Mr. Colver is a Democrat, forty-six years of age. For many years he was associated either as editor or publisher with the Scripps-McRae League of newspapers, the Newspaper Enterprise Association, etc.

The positions pay $7,500 a year. Mr. Colver is appointed to fill out Mr. Hurley's unexpired term and Mr. Fort is appointed for a term of six years.

Union Switch & Signal Plans New Shops

As noted last week, this company's machine shop and packing department were destroyed by fire on Feb. 10. However, the foundry, forge shop, pattern and carpenter shops and the general offices, which house the drawings, were untouched.

G. A. Blackmore, vice-president, Union Switch & Signal Company, has stated that "the buildings formerly used for munitions work (which work was completed last October), comprising over 65,000 sq. ft. of floor space, are immediately available, as is also certain space in our other undamaged buildings, and this space will be utilized for machinery formerly located in the destroyed building. Temporary buildings are also being erected. We also expect to utilize to the fullest extent practicable the offers of the associated Westinghouse companies to assist us in every way possible. Orders for large quantities of machine tools on which we are assured early deliveries have already been placed.

"Plans are well under way for a new permanent machine shop having a capacity much greater than the former one, and equipped with most modern machinery and appliances for the manufacture of signaling material. We have such confidence in our ability to continue the manufacture of our products that we are now ready to accept future orders subject to reasonable delays.

Heavy Copper Sales Reported

High prices of copper have brought to light supplies of the red metal that were not known to exist. It has been generally supposed that practically all of the first half copper had been contracted for by consumers. However, it is reliably reported that sales last week totaled between 25,000,000 and 30,000,000 lb., mostly in large lots. Several sales of small lots were reported at prices a cent or two above market quotations.

Buyers are still disinclined to anticipate their needs very far in advance. Most of the buying now is for early summer delivery.

Market quotations on Wednesday for electrolytic were as follows, showing a slight increase over last week: February, 36.5 cents; March, 36.25 cents, second quarter 34.5 cents; third quarter 31.5 cents and fourth quarter 30.25 cents.

CURRENT PRICES FOR MATERIALS

Quoted Wednesday, Feb. 21.

Copper (electrolytic)	New York, 36 cents per pound
Rubber-covered wire (base)	New York, 40 cents per pound
No. 0000 feeder cable (bare)	New York, 37½ cents per lb.
No. 0000 feeder cable (stranded)	New York, 35 cents per pound
No. 6 copper wire (insulated)	New York, 37½ cents per pound
No. 6 copper wire (bare)	New York, 37 cents per pound
Tin (straits)	New York, 48¾ cents per pound
Lead	New York, 9½ cents per pound
Spelter	New York, 10¾ cents per pound
Rails, A. S. C. E., O. H.	Mill, $40 per gross ton
Rails, A. S. C. E., Bess	Mill, $38 per gross ton
Wire nails	Pittsburgh, $3 per 100 pounds
Steel (bars)	Pittsburgh, 3.25 cents per pound
Sheet iron (black, 28 gage)	Pittsburgh, 4.75 cents per pound
Sheet iron (galv., 28 gage)	Pittsburgh, 6¾ cents per pound
I-beams over 15 in.	Pittsburgh, 10 cents per pound
½-in. galv. extra high strength steel wire,	New York, $6.82 per 100 ft.
⅜-in. galv. high strength steel wire	New York, $3.41 per 100 ft.
⅜-in. galv. Siemens-Martin wire	New York, $2.52 per 100 ft.
5/16-in. galv. Siemens-Martin wire	New York, $1.94 per 100 ft.
Galvanized barb wire and staples	Pittsburgh, 3.85 cents per pound
Galvanized wire (ordinary)	Pittsburghh, 3.65 cents per pound
Cement (carload lots) with rebate for sacks,	New York, $2.07 per barrel
Cement (carload lots)	Chicago, $1.96 per barrel
Cement (carload lots)	Seattle, $2.60 per barrel
Sand in large lots	New York, 50 cents per ton
Linseed oil (raw, 5-bbl. lots)	New York, 94 cents per gallon
Linseed oil (boiled, 5-bbl. lots)	New York, 95 cents per gallon
White lead (100-lb. keg)	New York, 9¾ cents per pound
Turpentine (bbl. lots)	New York, 52 cents per gallon

OLD METAL PRICES

Copper (heavy)	New York, 32½ cents per pound
Copper (light)	New York, 31½ cents per pound
Red brass	New York, 21 cents per pound
Yellow brass	New York, 19¼ cents per pound
Lead	New York, 8½ cents per pound
Steel car axles	Chicago, $34 per net ton
Zinc	8¾ cents per pound
Iron car wheels	Chicago, $18 per gross ton
Steel rail (scrap)	Chicago, $24.50 per gross ton
Steel rail (relaying)	Chicago, $34 per gross ton
Machine shop turnings	Chicago, $9.25 per net ton

Important Change in Supply Organization

The National Railway Appliance Company, a new concern, announces that it has taken over the entire railroad department business of the U. S. Metal & Manufacturing Company, which has been well represented in the supply business for the past sixteen years.

The new company will have temporary offices at 165 Broadway, New York City, and the officials elected are well known in the railway equipment field. B. A. Hegeman, Jr., president, was formerly in the railroad business. He started in 1878 with the D. L. & W. R. R., later being made general manager of the Lackawanna Live Stock Transportation Company. From this position he went with the American Car & Foundry Company as Eastern sales agent and in 1901 was selected as the president of the U. S. Metal & Manufacturing Company, which position he has occupied for the past sixteen years. Mr. Hegeman is vice-president of the New York & North Shore Traction Company, vice-president of the Damascus Brake Beam Company, Cleveland, Ohio; president of the Anglo-American Varnish Company, Newark, N. J.; chairman of the finance committee of the New York Railroad Club, and in 1914 was president of the Railway Supply Manufacturers' Association.

Charles C. Castle, first vice-president, has long been in the supply business. He was for many years vice-president of the Hildreth Varnish Company and became associated with the U. S. Metal & Manufacturing Company in 1910 as manager of the railroad department. He is vice-president of the Anglo-American Varnish Company, Newark, N. J., and secretary and treasurer of the Geneseo Corporation, Rochester, N. Y., and was president of the American Electric Railway Manufacturers' Association in 1911.

Harold A. Hegeman, vice-president and treasurer, has also been connected with the U. S. Metal & Manufacturing Company for the past nine years, as salesman, and is well

known throughout New England and New York State among steam and electric railway officials.

F. C. Dunham, assistant to the president, has been with the U. S. Metal & Manufacturing Company for the past thirteen years as special sales agent and during that period he has made a wide acquaintance among railroad officials through the promotion of the sales of the Dunham hopper door device.

Edward D. Hillman, secretary and engineer, graduated from Lehigh University in 1898, with the degree of mechanical engineer. He was connected with several manufacturing concerns as engineer during the next four years, entering the employ of the New York Central & Hudson River Railroad in February, 1902. From 1902 to 1905 he was in the motive power and rolling stock department, going to the electrical department in December, 1905, where he remained until February, 1906, when he entered the employ of the U. S. Metal & Manufacturing Company as mechanical engineer.

The company has established a branch office in the McCormick Building, Chicago, Ill., under the management of Walter H. Evans. A branch office has also been opened in the Munsey Building, Washington, D. C., under the management of J. Turner Martyn. Both managers were formerly connected with the railroad department of the U. S. Metal & Manufacturing Company.

ROLLING STOCK

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., is reported to be in the market for four cars.

Helena Light & Railways, Helena, Mont., is reported to be considering the purchase of several new cars.

Goldsboro (N. C.) Electric Railway is said to be in the market for some new equipment.

London & Port Stanley Railway, London (Ont.), Canada, expects to purchase a motor freight car at a cost of $23,500.

Michigan Railway, Kalamazoo, Mich., has ordered from the St. Louis Car Company one 60-ft. motor baggage car which will be equipped with Baldwin trucks.

New York State Railways (Syracuse Lines), Syracuse, N. Y., are in the market for thirty-five double-truck center-entrance cars.

Three Rivers Traction Company (Que.), Canada, has ordered three light-weight, safety, one-man cars from the St. Louis Car Company.

Johnstown Traction Company, Johnstown, Pa., is reported to have placed an order with the St. Louis Car Company for ten double-truck cars.

Northern Ohio Light & Traction Company, Akron, Ohio, has ordered from the St. Louis Car Company four 60-ft. baggage and express cars. Two of the cars will be equipped with St. Louis trailer trucks and two with Baldwin motor trucks.

American Railways, Philadelphia, Pa., has ordered six double-truck city cars from the St. Louis Car Company for the Roanoke Electric Railway. This company is also reported to have purchased ten cars from the J. G. Brill Company for the Wilmington & Philadelphia Traction Company.

TRADE NOTES

William J. Hammer, consulting electrical engineer, announces the removal of his office to 55 Liberty Street, New York City, suite 2510, Liberty Tower Building.

R. H. Harper has resigned as general sales manager of the B & K Manufacturing Company and has joined the sales organization of the Western Electric Company at the Philadelphia office.

Veeder Manufacturing Company, Hartford, Conn., has issued catalog No. 120 on its speed counters, tachometers and tachodometers. In addition to recording and speed counters, this company also manufactures fine die castings.

F. L. Gordon has been appointed assistant to the vice-president, and L. R. Dewey has been made Western sales manager of the American Brake Shoe & Foundry Company, with headquarters at Chicago.

John A. Foulks, who has been associated with the Indianapolis Switch & Frog Company for the last eight years, and who is now Eastern representative of the company, has sent in his resignation effective March 1.

J. G. White Company, New York, N. Y., announces the election as vice-president of the company of Russell B. Marchant, formerly treasurer of the company; Douglas I. McKay, formerly assistant to the president, and Sanger B. Steel, formerly manager of the Paine-Webber & Company, Chicago.

E. A. Garrett, who for the past four years has been publicity manager for the Busch-Sulzer Brothers-Diesel Engine Company of St. Louis, has resigned to accept a position with the Boston (Mass.) Belting Company. Prior to his connection with the Diesel Engine Company Mr. Garrett was manager of the Twinplex Sales Company.

American Institute of Consulting Engineers, Inc., New York, N. Y., at its annual meeting on Jan. 15, elected A. M. Hunt, Lewis B. Stillwell, William J. Wilgus and Gardner S. Williams members of the council to fill the places of retiring members. At the council meeting on Feb. 6 the following officers were elected for the year 1917: George Gibbs, president; Lewis B. Stillwell, vice-president, and F. A. Molitor, secretary and treasurer.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has purchased the Idaho Southern Railroad, which operates between Gooding and Jerome, Idaho, and the Milner & North Side Railroad, a short line extending from Milner to Oakley, Idaho. These roads, which comprise a total of approximately 50 miles, were built only a few years ago by Pittsburgh capital. The purchasers will dismantle the roads and sell the rails and other equipment, which are practically new.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently occupied a large four-story building situated on the corner of Thirty-sixth Street and Tenth Avenue, New York City. The entire building is being utilized as a service station, repair shop and warehouse. It is equipped to handle repairs of every kind, type and size of electrical machinery, and will employ more than seventy men.

McQuay-Norris Manufacturing Company, St. Louis, Mo., announces that J. H. Bishop, P. T. Egbert, Arthur F. Frost, J. H. Griffith, George Heidenreich and G. T. Parsons have joined the forces of the company. Mr. Bishop is assigned to the Kansas City office, Mr. Frost to the Dallas office, Messrs. Parsons and Egbert to the New York office, Mr. Griffith to the Pittsburgh office and Mr. Heidenreich to the Cincinnati office. All these men are graduate mechanical engineers.

ADVERTISING LITERATURE

Electric Storage Battery Company, Philadelphia, Pa., has issued bulletin 160 on its "Iron-Clad Exide" batteries for storage battery industrial trucks.

Central Electric Company, Chicago, Ill., has issued bulletin No. 45 on its Balco line of detachable plugs and receptacles for shops, round houses, factories, docks and terminals.

Mesta Machine Company, Pittsburgh, Pa., has issued bulletin D on its automatic plate valves for use in both new and rebuilt air and gas compressors, ammonia compressors, vacuum pumps and blowing engines.

Locke Insulator Company, Victor, N. Y., is distributing supplement No. 1 to its insulator book. This book presents ten designs of insulators for voltages ranging from 27,000 to 80,000.

H. M. Byllesby & Company, New York, N. Y., announce that exceptionally complete annual reports showing the progress made by Standard Gas & Electric Company and the Northern States Power Company will be sent to investors.

Railway Improvement Company, New York, N. Y., has issued a booklet on "A Few Words to Motormen About Rico Coasting Recorders." It explains how the avoidance of certain operating faults by motormen will result in more coasting, less energy consumption and greater safety. The illustrations are of cartoon type. The booklet was prepared as a part of the educational service which this company gives to users of Rico coasting recorders, but the company will be pleased to furnish copies on request.



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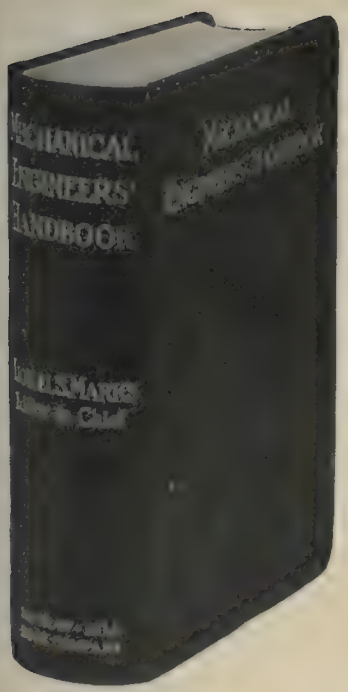
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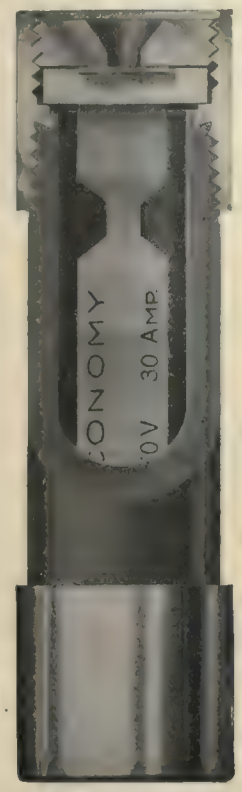
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Western Electric

Railway Electrical supplies are held ready for shipment at

32 Distributing Houses

one of which is near you —and a list of which is below.

Our electrical supplies are all quality products and cover everything electrical.

Let our nearest house quote you on your electrical needs.

Western Electric Company
INCORPORATED

New York	Atlanta	Chicago	Kansas City	San Francisco
Buffalo	Richmond	Milwaukee	St. Louis	Oakland
Newark	Savannah	Indianapolis	Dallas	Los Angeles
Philadelphia	New Orleans	Detroit	Houston	Seattle
Boston	Birmingham	Cleveland	Oklahoma City	Portland

Pittsburgh Cincinnati Minneapolis St. Paul Omaha Denver Salt Lake City

EQUIPMENT FOR EVERY ELECTRICAL NEED

The On-Time Advertiser

who gets his copy and cuts to us well before the day his advertisement should go to press, gets better type composition, better location and a better opportunity to make necessary corrections on the proofs, which can then be submitted before publication.

The Last-Hour Advertiser

whose copy and cuts come in at the last minute or even later, gets the best attention we can possibly give him. We work overtime to do what we can for him. But the lack of sufficient time makes it physically impossible to do as well for him as for the advertiser whose instructions come in well before the last hour.

Get Your Copy and Cuts in Early

Do this, not on our account, but for the sake of your own advertising. We want to serve all advertisers equally well—but we can't put more hours into a day, and the advertiser who gives us the most time gets the best results.

Copy and cuts should be in our hands by Thursday of the week preceding the date of issue. This means that Thursday is the *last* day on which copy can be handled normally.

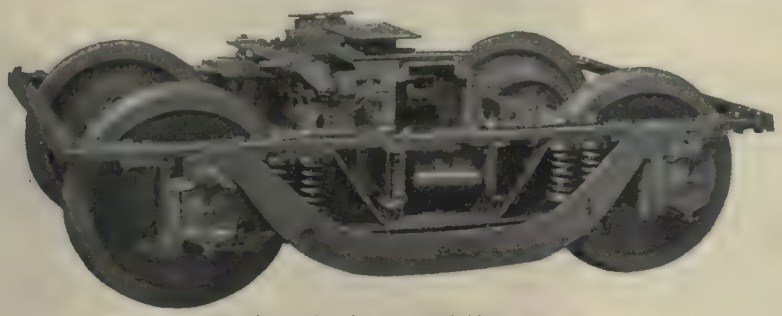
After that we cannot promise proofs, and we cannot insure classification.

For good advertising, get your cuts and copy in every week *before* Thursday.

Electric Railway Journal
239 West 39th Street, New York

High-Speed Service

The big electric interurban car travels at speeds equal to those of fast express trains on steam roads. It provides service of a high standard, and hence must be up to the minute in every detail of its equipment.



Baldwin Truck, Class 84-30-AA.
Built for Dayton & Troy Electric Ry. Co.

The Baldwin Class "AA" truck is used in high speed service on many of the leading electric railways in this country, and is doing some exceptionally fast work. Consider the merits of this design before ordering the truck equipment for your new interurban cars. Further particula rs will be gladly furnished on request.

THE BALDWIN LOCOMOTIVE WORKS

Philadelphia, Pa.

REPRESENTED BY

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Charles Riddell, 627 Railway Exchange, Chicago, Ill.
C. H. Peterson, 1210 Boatmen's Bank Bldg., St. Louis, Mo.
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A. Wm. Hinger, 722 Spalding Building, Portland, Ore.
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To meet the requirements of its high class service—

The London & Port Stanley Railway

ordered

Jewett Steel Cars

one of which is shown above.
They are decidedly "cars of character."
Let us figure on *your* new requirement.

THE JEWETT CAR CO., Newark, Ohio

THE LINDSLEY BROTHERS CO.

Western **"Good Poles Quick"** Northern

Quick Shipments from our Minneapolis Yard

Rooms 832-834, 72 West Adams St., Chicago, Ill.
Spokane - St. Louis

Butt Treating
Open Tank and
"Hot and Cold" Processes

The Trenton THREE SECTION TOWER

outfits for any make of chassis. Make a low, well-balanced outfit on the road with maximum elevation in use

Send postal for literature and prices.



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ELECTRICAL WIRES AND CABLES



JOHN A. ROEBLING'S SONS COMPANY
Trenton, N. J.

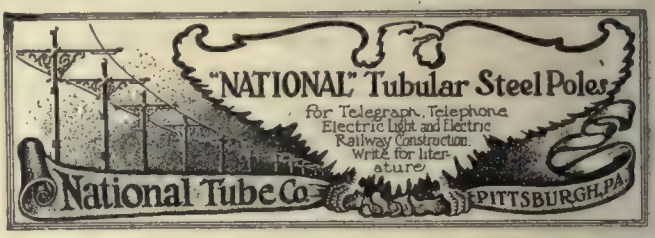
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SEND FOR PAMPHLET

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We brag about the SERVICE we give

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Commit us to memory.

AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Poles, Harps and Wheels. Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

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Established 1877.

Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 48 Milton Street.

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ALBANY, N. Y.

CONSULT OUR ENGINEERS ON YOUR SIGNAL REQUIREMENTS

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Aristos "COPPERWELD"—Copper Clad Steel Wire—

Beats Solid Copper 40 Ways

Cheaper—Lighter—Stronger—Higher Elastic Limit—Costs less to Maintain

GET DATA

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Transmission Line and Special Crossing Structures, Catenary Bridges

Write for our New Descriptive Catalog.

ARCHBOLD-BRADY CO.

Engineers & Contractors SYRACUSE, N. Y.

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DISPATCHER — MOTORMAN

Direct Contact Between
Dispatcher and Motorman
Write for Details
SIMMEN AUTOMATIC RAILWAY SIGNAL CO
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for all classes of electrical construction and repair work. Write for catalog.

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FREE



—a handbook on economical connections—and a sample Frankel Solderless Connector.

MAKERS OF THE BEST ONLY
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CONNECTOR CO. INC N.Y.

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The man on your road responsible for economical and proper electrical connections will appreciate the story that this book and sample connector will tell.

Both represent new ideas—both point the way to better splices.

You incur no obligation in writing for them. Do it now.

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Bates Steel Poles in use by the DES MOINES CITY RAILWAY, Des Moines, Iowa, U. S. A.

Strongest STEEL POLE of like weight in the world.
Best STEEL POLE in the world for electric railway trolley service.
Most artistic STEEL POLE in the world for any service.
We make the lowest prices.
We have constantly on hand about two thousand tons of steel and can make immediate shipments.
A full line of convenient malleable fittings.
Our steel pole TREATISE tells a big story, ask for it.

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208 South La Salle St., Chicago, Ill., U. S. A.

AWARDED
PANAMA PACIFIC INTERNATIONAL EXPOSITION
GRAND PRIZE

American Rail Bonds

Crown
United States
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Railway Feeders

And all kinds of **Electrical Conductors**

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed. Write for prices and full information.

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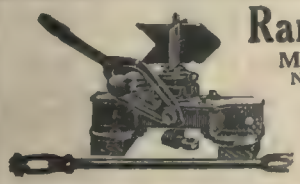
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Fibre Track Insulation

DIAMOND STATE FIBRE CO.
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Automatic Switch Stands, T-Rail Special Work, Manganese Construction, Crossings, Switches, Etc.

Scale will not adhere firmly to boilers, no matter how bad the feed water if

DIXON'S BOILER GRAPHITE

is used. No other form of graphite fights the formation of scale so persistently and successfully. Booklet No. 108-T.

Made in Jersey City, N. J., by the
JOSEPH DIXON CRUCIBLE COMPANY
Established 1827 T-27

"ACME" NESTABLE

CORRUGATED CULVERTS

MADE OF

GUARANTEED 99.90% PURE — NO-CO-RO METAL — GUARANTEED 99.90% PURE

"From the tests I have made I know that this is a *very pure metal*"

Listen to this, gentlemen!—

"What I have used of your culvert material in the last four years is proving very satisfactory. I anticipate from results to date that it will be many years before these culverts commence to show any deterioration whatsoever."

YOU want culverts that will RESIST DETERIORATION—that are STRONG—that won't wash out—don't you? Sometimes you want them Set-up—sometimes knocked down (nested). Well then—we want to send you Catalog G-3.

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MANUFACTURERS
CANTON, OHIO, U.S.A.

SPECIAL TRACK WORK

Built to withstand severe service



SWITCHES
FROGS
CROSSINGS
and
COMPLETE
LAYOUTS

New York Switch & Crossing Co.
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HIGHEST QUALITY

TRACK SPECIAL WORK

HIGHEST QUALITY — FROGS — CROSSINGS — F & C Co. — SWITCHES — STANDS — SAFETY — DURABILITY

WE MAKE THIS GRADE ONLY

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The Babcock & Wilcox Company
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WATER TUBE STEAM BOILERS

Steam Superheaters — Mechanical Stokers

Works: BARBERTON, OHIO—BAYONNE, N. J.

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Greatly Increase Efficiency and Power of Steam Turbines.
POWER SPECIALTY CO.
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NEW YORK

Murphy AUTOMATIC Furnace

CONSERVES energy and triples the steaming capacity of your boilers. Write for Catalog "C."

MURPHY IRON WORKS
Detroit, Mich. U.S.A.

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The MODERN WAY of handling ASHES is by the

PATENTED GECO

GECO
STEAM JET CONVEYOR

GREEN ENGINEERING CO.
East Chicago, Indiana

Bulletin No. 1 Green Chain Grate Stokers.
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Coal Contains Energy
Scaled Boilers Waste Coal Energy

Scale incrusts tubes and plates, choking up the boilers until the quantity of coal required to produce a given horsepower is far out of proportion. And there is damage in the way of pitting under the scale, bagging, and wear and tear of mechanical cleaning.

Dearborn Treatment

is the efficient method of keeping the boilers free from scale. It is made to suit actual requirements; there is no waste, and no injurious by-products. It is economical and effective.

Write for our new booklet on Boiler Water Treatment.

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POWER IS PRECIOUS

Every ounce of steam is needed in your plant. Use the

SKIP HOIST

to handle your ashes. This device consumes only four electrical horsepower. Will handle large clinkers, soot, etc., *without clogging.*

Automatic in operation. One pull on the rope causes the bucket to ascend, discharge and return.

Catalog No. 32 gives many points of superiority over all other types of ash conveyors. Write today for your copy.



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111 S. 5th Street, Philadelphia
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Builders of Coal, Ashes and Coke Handling Equipment

Packard

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Our name plate on an instrument implies unquestionable service qualities.
Restriction of our types and sizes to 33,000 V. and less—
400 KVA—60 Cy. 300 KVA—25 Cy. self-cooled. Also 750 KVA—60 Cy. 500 KVA—25 Cy. water-cooled, and below, and largely increased factory space guarantees our usual immediate shipment.
Phone, wire or mail specifications.
Write for Transformer Bulletin ERJ.
It's a transformer text-book.



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I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

KINNEAR Steel Rolling Doors
FOR CAR HOUSES

Compact, Durable, Easily and Speedily Operated and Fireproof. Openings of any size may be equipped and the doors motor-operated if desired. Manufactured by the
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Repair Shop Machinery and Cranes

Built by

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Wasted Current Brings No Dividends



An overheated car is worse than one which is not heated enough. It not only nauseates passengers but wastes your good current.

Start saving this current *now*—by installing the

Consolidated System of Thermostatic Regulation

The car temperature is kept uniform at all times, the thermostat automatically switching the heaters on and off.

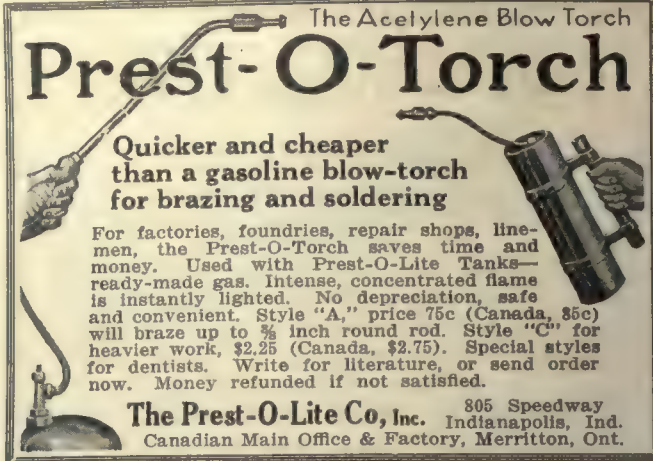
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Consolidated Car-Heating Co.

New York Albany Chicago

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Prest-O-Torch



Quicker and cheaper than a gasoline blow-torch for brazing and soldering

For factories, foundries, repair shops, linemen, the Prest-O-Torch saves time and money. Used with Prest-O-Lite Tanks—ready-made gas. Intense, concentrated flame is instantly lighted. No depreciation, safe and convenient. Style "A," price 75c (Canada, 85c) will braze up to ⅝ inch round rod. Style "C" for heavier work, $2.25 (Canada, $2.75). Special styles for dentists. Write for literature, or send order now. Money refunded if not satisfied.

The Prest-O-Lite Co, Inc. 805 Speedway Indianapolis, Ind.
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Full Power with High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.



The Buckeye Jack Mfg. Co.
Alliance, Ohio

3

INSULATING TAPE



of Quality

STANDARD
Woven Fabric Co
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The Best Shade Rollers for Cars

SPECIAL shade rollers for cars, that will last and give satisfaction for years, and yet cost but little more than the poorest you can buy, are made by the Stewart Hartshorn Co., E. Newark, N. J. This company is by far the largest shade roller manufacturer in the world. It is able to give high quality at lower prices because of the enormous output. Write for catalog, stating wants. You are always protected when you buy shade rollers if they bear the signature *Stewart Hartshorn*

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK & MFG. CO.
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The Standard for Speed, Accuracy, Durability

B-V Visible Punch

Look for this B-V. Trade Mark

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Barrett Track and Car Jacks
Barrett Emergency Car Jacks
Duff Ball Bearing Screw Jacks
Duff Motor Armature Lifts

The Duff Manufacturing Co., Pittsburgh, Pa.

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D & W Fuses, Deltabeston Wire Delta Tape

D & W Fuse Co., Providence, R. I.



Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
Faster than the ticket seller
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Wendell & MacDuffie Co., 61 Broadway, New York
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The Men Who Plan and Execute

owe some of their efficiency to the thought, energy and resourcefulness of manufacturers who supply the means for such achievements.

These men know how important it is for them to keep in touch with the manufacturers.

In the electric railway industry, such men find the easy, certain and thorough way to keep in touch with manufacturers is through the advertising pages of the

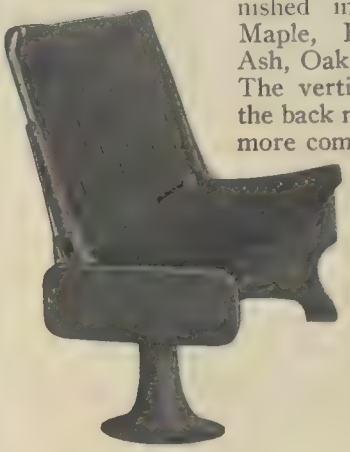
Electric Railway Journal

239 West 39th Street **New York**

H. & K. No. 300-A

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An inexpensive, sturdy, sanitary seat. It has all the famous Hale & Kilburn features, such as Pressed Steel Pedestals, "Walkover" reversing mechanism and proper shaping of seat and back to make riding comfortable. Furnished in polished Maple, Birch, Cherry, Ash, Oak or Mahogany. The vertical slatting of the back not only affords more comfort than horizontal slatting but is also much handsomer.



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Johnson Registering Fare Box

used in connection with the car register increase receipts $1.00 per car, per day, counts metal tickets the same as cash, thus giving a positive check on all class of fares.

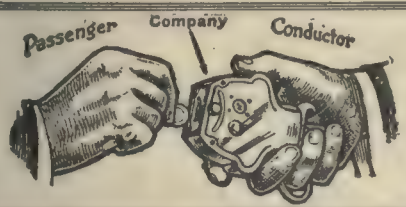
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For the Answer to your Fare Collection Problems
Write for
"Earnings Per Passenger Mile"
It tells how the
BONHAM TRAFFIC RECORDER
Will Meet Your Needs
The Bonham Recorder Co., Hamilton, Ohio





Direct Automatic Registration By the Passenger
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Ventilation—Sanitation—Economy—Safety

All Combined in

THE COOPER FORCED VENTILATION HOT AIR HEATER

Patented September 30, 1913. Ask for the full story.

We Also Manufacture Pressed Steel Hot Water Heaters

THE COOPER HEATER CO., CARLISLE, PA.

RAILWAY UTILITY CO.

Sole Manufacturers

"Honeycomb" and "Round Jet" Ventilators
for Monitor and Arch Roof Cars, and all classes of buildings; also
Electric Thermometer Control
of Car Temperatures.

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The Eclipse Railway Supply Co.
CLEVELAND, OHIO

Manufacturers of the

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You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

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The National Standard for Car Curtains and Car Upholstery

AGASOTE HEADLINING

The only headlining made in one solid piece. Will not separate, warp or blister. Waterproof and homogeneous.

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

WE CAN CUT YOUR COST OF HEATING CURRENT
WRITE FOR THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
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LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., NewYork

MASON SAFETY TREADS—prevent slipping and thus obviate damage suits.
KARBOLITH CAR FLOORING—for steel cars is sanitary, fireproof and light in weight.
STANWOOD STEPS—are non-slipping and self-cleaning.
Above products are used on all leading Railroads. For details address
AMERICAN MASON SAFETY TREAD CO.
Main Offices: Lowell, Mass. Branch Offices: Boston, New York City, Chicago, Philadelphia, Kansas City, Cleveland, St. Louis.

Have you our new
Trolley Wheel Bulletin
Write for your copy
The Eureka Company North East, Pa.

"GLOBE" VENTILATORS



An Efficient Ventilator at a reasonable price



Globe Ventilator Co., Troy, N. Y.

UNIVERSAL ANTI-SLIP TREADS

cars and station steps.
Universal Safety Tread Company
Waltham, Mass.



AMERICAN BRUSHES are made in every type —carbon, graphite and metal composition. Made in America—prompt delivery of high quality brushes for any requirement is assured.

AMERICAN CARBON & BATTERY CO. ST. LOUIS, MO.

UNION SPRING & MFG. CO.

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COIL AND ELLIPTIC

M. C. B. Pressed Steel Journal Box Lids

General Office: First Nat'l Bank Bldg.
PITTSBURGH PA.

Works: New Kensington, Pa.

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Missouri Trust Bldg., St. Louis, Mo.

Leaky Valves are Expensive
in that they *Shorten the Life* of
COMPRESSOR-MOTOR
Equipments

Let our AIR RECTIFIER

demonstrate to you what it will do to keep the valves clean and working right.

National Safety Device & Mfg. Co.
2415 Smalley Street, Chicago, Ill.
Eastern Electric Railway Agent
HORNE MFG. CO., BROOKLYN, N. Y.

Steel for Service

The demands for better wheels than railroads (both steam and electric) had been able to secure resulted in the manufacture of

Schoen Steel Wheels.

This company also makes

Rolled Steel Gear Blanks

which, to the gear problem, have proved to be as great an advancement as the rolled steel wheel was to its part of railroad service.

Carnegie Steel Company
General Offices, Pittsburgh, Pa.

847

TULC

We base all our "ads" on facts. We guarantee TULC and stand back of it. Others have shown a large saving with TULC. It has been proven to be the best lubricant.

THE UNIVERSAL LUBRICATING CO.
Schofield Building CLEVELAND, O.

"Boyerized" Products Reduce Maintenance

Bemis Trucks	Manganese Brake Heads
Case Hardened Brake Pins	Manganese Transom Plates
Case Hardened Bushings	Manganese Body Bushings
Case Hardened Nuts and Bolts	Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.
2325 So. Pauling St., Chicago, Ill.

The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

HORNE RAILWAY DEVICES

Horne Double Acting Brakes	Lord Screenless Air Cleaners for Compressors
Giant Geared Brakes	Hydrogrounds and Lightning Arresters
Differential Staffless Brakes	Fenders and Wheelguards
Sterling Safety Brakes	Controller Fingers
Sterling Trolley Bases	Friction and Rubber Tape
Sterling Sand Boxes	Packing and Gaskets
Air Rectifiers, eliminating frozen air brake piping	Air Hose and Rubber Specialties
Q-P Trolley Catchers	

HORNE MANUFACTURING CO., 50 Court St., Brooklyn, N. Y.

SEARCHLIGHT SECTION

IMMEDIATE SHIPMENT

1000 K. W. 575 Volt Direct Connected Generating Set

1—1000 KW. General Electric type M.P. form H, 575 volt, 1739 amps. 14 pole generator direct connected to 24 and 48 x 42" McIntosh & Seymour cross compound vertical engine, speed 120 r.p.m.

200 Kilowatt 60 Cycle Rotary Converters

2—200 KW. Westinghouse 3 ph., 60 cy. rotary converters, 370 v. A. C., 575 v. D. C., 720 r.p.m., with starting motors, also transformers if desired.

150 Kilowatt 60 Cycle Rotary Converters

2—150 KW. Westinghouse 3 phase, 60 cycle rotary converters, 550 volts, 273 amps., 720 r.p.m., complete with
4—100 KW. Westinghouse Scott connected oil insulated transformers, 10,000/9500 volts prim., 430/362 volts secy.

25 Cycle Rotary Converters

2—200 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.
3—150 KW. General Electric type T. C., 4-150-750, 25 cycle, 3 phase, 575 volt, rotary converters, 750 r.p.m., complete with end play and speed limit device.

Transformers

2—375 KVA. General Electric type, 60 cy., 9600 volts prim., 575 v. secy.
4—100 KW. Westinghouse transformers, oil insulated, single ph., 60 cy., 2300 v. primary, 360 v. secondary.
4—100 KW. Westinghouse, oil insulated, Scott connected transformers, 10,000/9500 v. primary, 430/362 v. secondary.
6—75 KW. General Electric, 13,200-6600 volts, 385 volts sec. Transformers.

Railway Motor

1—75 to 90 HP. Westinghouse No. 112 Railway Motor, newly rewound, practically new.

IMMEDIATE DELIVERY

ARCHER & BALDWIN
114-118 Liberty Street New York City
TELEPHONE 4337-4338 RECTOR

MACGOVERN & COMPANY, Inc.

114 LIBERTY STREET NEW YORK CITY

Steam and Electrical Machinery

Air Compressors, Pumps, Hoists, etc.

For Sale

Five Open Cars

Length over all 30 ft. Seating capacity 50. Two fully equipped for operation.

First Class Condition

Can offer very attractive price to anyone interested.

Albany Southern Railroad Co.
Rensselaer, N. Y.

For Sale

Two 500 Kilowatt, 6-phase, 25-cycle, 6600 volts, ROTARY CONVERTERS for operation on Edison three-wire system, with transformers, machine panels; 4 feeder panels and auxiliary apparatus, consisting of fans and motors, induction regulators and starting panels. This equipment is of the General Electric Company's manufacture and is in first-class condition. *The Kansas City Rys. Co., Purchasing Dept., Kansas City, Mo.*

CARS FOR SALE

OPEN and CLOSED
MOTOR and TRAIL
Write for Price and Full Particulars to
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg. Philadelphia, Pa.

COMPLETE ARMATURES FOR SALE
FOR ALL THE STANDARD STREET RAILWAY MOTORS
GET OUR PRICE WE CAN SAVE YOU MONEY
America's Greatest Repair Works
CLEVELAND ARMATURE WORKS, Cleveland, O.

MISCELLANEOUS WANTS

Wanted—Company to Manufacture

An established manufacturing company of electric railway supplies to manufacture an important supply of a late, efficient railway necessity. Address Box 1384, Elec. Ry. Journal.

Wanted at Once

For immediate shipment any quantity of battery lead plates, sediment scrap copper and wire, brass and all other grades of scrap material. Write to us today for our prices. National Metal & Rubber Co., 31 India Wharf, Boston, Mass.

FOR SALE

Fare Boxes for Sale

100 Johnson registering fare boxes. In excellent operating condition. Greatly reduced prices. For immediate shipment address Nelson P. Hall, Sales Agency, 14 East Jackson Blvd., Chicago, Ill.

Immediate Shipment

Ridgway Dynamo & Engine Co. 200 kw. Generator, 500 volt. As good as new. Must sell quickly. Direct connected.

M. K. FRANK
Frick Bldg., Pittsburgh, Pa.

FOR SALE

52" Wheel Turning Lathe

For sale at a bargain—Niles 52" wheel turning lathe, motor drive, at a bargain. Apply

L. Brenner & Co., Lebanon, Pa.

SEARCHLIGHT SECTION

FOR SALE

INTERURBAN CARS

3—51 ft. Combination Passenger & Baggage. (4 ft. 8½" gage)
Seating Capacity 45.
Trucks Brill No. 27.
4 Motors Westinghouse 310. H. L. Control.

2—52 ft. 13 Bench Open Trailers.
Steel Underframe.
Trucks Brill No. 1 M. C. B.
All first-class condition.
Immediate delivery.
Write, wire, or 'phone

ZELNICKER
WALTER A. ZELNICKER SUPPLY COMPANY
St. Louis

1st Nat'l Bk., Chicago. Hennen Bldg.. New Orleans
Main Office, 325 Locust St., St. Louis

Read This *BEFORE* You Write

In a new book of 176 pages on "Selling Your Services," there is a large amount of good advice—some of it worth many times the price of the book—including the following:

"The average letter of application starts with a few inane remarks, continues with a few sentences covering the applicant's education and experience, and ends up by crediting the author with a few general qualities, like honesty, ambition and enthusiasm. If you write this kind of letter in answer to an advertisement, you may be sure that most of the letters received by the prospective employer will be just like it. Therefore, if you want to head your letter toward the waste-basket, write it in this form.

"A better way is to analyze carefully the requirements stated by the employer and decide just how your own experience fits in with these requirements. Then lay your plans to demonstrate to the prospective employer that your previous training and experience have fitted you to be of service to him in the manner outlined in his advertisement.

"* * * When writing your letter of application bear firmly in mind that your prospective employer has no other means of appraising your services than by your letter. He is not a mind reader and can judge only from the actual contents of your letter.

"* * * You may be exceptionally capable in your field, but you will find yourself greatly handicapped in trying to better yourself if you do not write a good letter of application.

"* * * Therefore, unless you know that your letter will create a favorable first impression, do not waste postage on it."

A man complained that he had replied to more than 30 advertisements of positions that he was competent to fill but had not received an acknowledgment of a single letter. The general appearance of his letter to us was the answer.

Your letter of application may be your one opportunity to secure just the position for which you are peculiarly fitted and have been looking all your life. You should make the most of it by giving it the same care you would a proposal to an heiress.

Electric Railway Journal

POSITIONS WANTED

AUDITOR—Certified public accountant desires connection with property located either in South or East. Several years' experience as executive and auditor for electric railway properties, both city and interurban. Young man, thoroughly up to date. Box 1375, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

AVAILABLE for busy executive: Assistant with unusual qualifications and experience. College graduate; Member of Bar. Six years in various executive offices of large railway and lighting company. Now law clerk for legal and claim departments. Can take charge of legal and claim work or other detail. Ability backed by judgment and experience. Box 1223, Elec. Ry. Jour.

ELECTRICAL engineer, married, 34, 7 years' experience; overhead construction and maintenance; high tension, subway, bonding, electrolysis, signals. Wants position as distribution engineer or superintendent of overhead. References including present employers. Box 1354, Elec. Ry. Jour.

ELECTRICAL engineering senior student at Cooper Union Institute desires position with electric railroad. Start at bottom and work up. Box 1383, Elec. Ry. Journal.

EXECUTIVE—Experienced executive desires connection with electric railway or large manufacturing property; several years' experience with industrial and electric properties as auditor and manager. First-class record and references. Box 1374, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

MANAGER—Technical engineer; 14 years' experience; all utilities, with two large syndicates; 5 years general manager in city 100,000 population. Position desired, temporary or permanent, any location. Box 1378, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

MANAGER, desirous change, can handle men successfully. Just pulled one system out of receiver's hands. Young man, married, technical graduate. Box 1348, Electric Railway Journal, 935 Real Estate Trust Bldg., Philadelphia, Pa.

MANAGER electric or steam railway, Spanish America preferred. 15 years' experience as executive, 10 years South America. Box 1387, Elec. Ry. Journal.

MASTER mechanic with good clean record a number of years with present employers on large electric railway system. Have experience in Eastern, Central and Southern States with all classes of equipment. Will soon be open for proposition. Box 1373, Elec. Ry. Jour.

TRAFFIC man—Ten years' experience, steam and electric. Age, 27. Single. Best references. Now traffic manager electric line. Desires change. Position with mercantile house preferred. Box 1376, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

TWENTY years' experience in street railway operation. Several years as general superintendent of large city and suburban electric system. Best of references. Box 1377, Elec. Ry. Journal.

YOU need a publicity man. I'm the one. Let me tell you how I would handle your situation. Box 1366, Elec. Ry. Journal, 935 Real Estate Trust Bldg., Phila., Pa.

POSITIONS VACANT

AN INTERURBAN road near Chicago wants an A-1 man on automatic air equipment, one that understands the overhauling of compressors, grinding valves, and repiping of cars. Give experience, salary expected, age, whether married or single, and reference when making application. Box 1385, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

CAPABLE man wanted to act as superintendent or assistant manager on small to medium-sized street railway property. One who has had general experience on small road and northern climate preferred. Give full information in first letter including experience, salary expected and references. Box 1386, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

ENGINEER wanted to act as chief engineer in large central station power house in an Atlantic seaboard city. Must be qualified to take charge of an 80,000 kw. plant and experienced in handling Curtiss turbines, jett and surface condensers, and Taylor stokers. Applicant must have experience in large central station plants. State age, experience and salary expected. If employed, give name of company and reason for changing. All replies strictly confidential. Box 1355, Elec. Ry. Jour.

WATCH engineer wanted for steam turbine station located in Central States. Please state age, experience and salary expected. Box 1380, Elec. Ry. Journal.

WANTED master mechanic for street railway system operating 12 cars in town of 20,000. Man must be familiar with armature winding and competent in all directions. Box 1381, Elec. Ry. Journal, 1570 Old Colony Bldg., Chicago, Ill.

Transportation Rate Expert Rank III

Salary $5,000 to $6,000 a Year

This position at the head of the Transportation Rate Department of the Illinois Public Utilities Commission is to be filled at once. Broad experience, expert knowledge of rate making, ability to meet the public and officials, and to work out transportation rate problems is essential. Open to citizens of the United States.

For further details and application blanks address Illinois State Civil Service Commission at Springfield, Illinois, or Room 602, No. 15 S. Market St., Chicago.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.

The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will probably furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.
National Safety Device Co.

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axles.
National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The
Western Electric Co.

Bankers and Brokers.
National City Co.

Batteries, Dry.
Western Electric Co.

Batteries, Storage.
Electric Storage Battery Co.
Western Electric Co.

Bearings and Bearing Metals.
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Long Co., E. G.
More-Jones Brass & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White.

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.
Western Electric Co.

Benders, Rail.
Niles-Bement-Pond Co.
Western Electric Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.

Boiler Tubes.
National Tube Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Ohio Brass Co.
Prest-O-Lite Co., Inc.

Bonding Tools.
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Bonds, Welded.
Lincoln Bonding Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Int'l Cresosoting & Constr. Co.
Lindsley Bros. Co.
Ohio Brass Co.
Western Electric Co.

Brake Adjusters.
Holden & White.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
General Electric Co.
Holden & White.
Long Co., E. G.
National Brake Co.
National Safety Device Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Brooms, Track, Steel or Rattan.
Western Electric Co.
Zelnicker Supply Co., W. A.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eurego Co.

Brushes, Carbon.
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
Dixon Crucible Co., Jos.

Buckets, Grab.
Beaumont Co., R. H.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunkers, Coal.
Beaumont Co., R. H.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co. John.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co. Inc. W. R.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Car Stops, Automatic.
Consolidated Car-Heating Co.

Castings, Brass.
Eureka Co.
Frankel Connector Co.
More-Jones Brass & M. Co.

Castings, Composition or Copper.
Anderson Mfg. Co., A. & J. M.
Eureka Co.
Horne Mfg. Co.

Castings, Gray Iron and Steel.
Amer. Brake Shoe & Fdy. Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdy. Co.
Bemis Car Truck Co.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Horne Mfg. Co.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N

Ceiling, Car. (See Heading.)

Chain & Belt Machinery.
Beaumont Co., R. H.

Charging Sets, Storage Battery.
General Electric Co.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Clamps.
Frankel Connector Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. (See also Snow-Plows Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.
Western Electric Co.

Cleats, Car Wiring.
General Electric Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Coils, Armature & Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The
Johnson Fare Box Co.



Model 370—A. C. and D. C. Ammeter
One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D. C. Wattmeter, Model 329 Polyphase Wattmeter and Model 341 A. C. and D. C. Voltmeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1% full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

THERE has been no other factor in creating the prestige which now surrounds the Weston name than the outstanding superiority of

Weston

Indicating Instruments

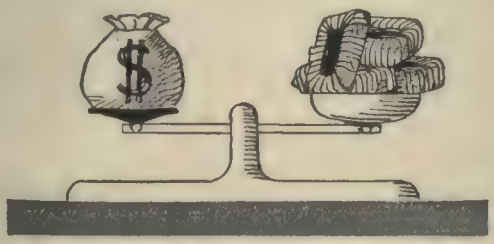
So high have Weston products established the name in the field of Electrical Measurement that it is in itself an endorsement of each Instrument that bears it.

It is our fixed purpose to maintain and, if possible, to increase the value of this endorsement.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits, Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

Weston Electrical Instrument Company
21 Weston Ave., Newark, N. J.

New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Petrograd
Chicago, Boston, Buffalo, Richmond, San Francisco, Florence
Denver, Detroit, St. Louis, Toronto, Winnipeg, Johannesburg, S. Africa
Montreal, Vancouver, Berlin, London, Paris



They're as Good as Cash

—those old field coils in your shops. Copper is worth too much to send to the melting pot. Send those old coils to us—let us remove the old insulation, clean and anneal the wire and reinsulate it with

Salamander Pure Asbestos

We will then rewind the wire into new coils of precisely the same characteristics as the old ones.

This is much cheaper for you than buying new coils, for the only charge we make is a very small one for the actual insulation used.

Send us some of those old coils so we can show you what we can do.

Independent Lamp & Wire Co., Inc.
Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago Washington, D. C.

RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
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Perry Side Bearings
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Garland Ventilator
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Special Agents for
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- Johnson Fare Box Co.
- C. & C. Electric & Mfg. Co.
- Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Kerschner Co. Inc. W. R.
Long Co., E. G
Western Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits.
Western Electric Co.

Connectors, Solderless.
Frankel Connector Co.
Horne Mfg. Co.

Controller Fingers.
Horne Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
Beaumont Co., R. H.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works.
Union Electric Co.

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Couplings, Conduit.
Horne Mfg. Co.

Cranes, (See also Hoists.)
Allis-Chalmers Mfg. Co.
Beaumont Co., R. H.
Niles-Bement-Pond Co.

Creosoting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Culverts.
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart.
Pantasote Co., The.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Prest-O-Lite Co., Inc.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co.

Destination Signs.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Detective Service.
Wisch Service, P. Edward.

Dispatching Systems.
Simmen Automatic Ry. Sig. Co.
Western Electric Co.

Door Operating Devices.
Consolidated Car-Heating Co.
National Pneumatic Co.

Doors and Door Fixtures.
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

Doors, Folding Vestibule.
National Pneumatic Co.

Doors & Shutters, Fireproof.
Kinnear Mfg. Co.

Doors, Steel Rolling.
Kinnear Mfg. Co.

Draft Rigging. (See Couplers.)

Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., Inc., H. M
Drum & Co., A. L.
Ford, Bacon & Davis.
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Roosevelt & Thompson.
Sanderson & Porter.
Scofield Engineering Co.
Stone & Webster Eng. Corp.
Westinghouse, Church, Kerr & Co.
White Companies, J. G.
Woodmansee & Davidson, Inc.

Engines, Gas and Oil.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

Engines, Steam.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

Fare Boxes.
Brill Co., The J. G.
Internat'l Register Co., The.
Johnson Fare Box Co.

Fences and Fence Posts.
American Steel & Wire Co.

Fencing Wire.
American Steel & Wire Co.
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THE *Brush Method* of Creosoting cedar and chestnut poles is economical and effective and results in a surprising decrease in the annual cost.

This method should be used:

1—When treatment must be given to poles in the field.

2—When annual consumption is less than 2,000 poles, 35 feet long or equivalent. (A greater number will warrant a central treating plant).

3—When the period of service the pole-line should render is greater than the natural life of the pole and does not exceed about 18 years, in which case the Open-Tank System is recommended.

The Government reports that "brush treatments with a *good preservative* give an increased life to poles sufficient to pay well for the cost of treatment."

Barrett's Carbosota Grade-One Liquid Creosote Oil

Recommendations for Butt Treatment of cedar or chestnut poles by the Brush Method

Condition of Pole—Poles should be seasoned until air-dry and otherwise conform to standard specifications. Green, wet or frozen poles should not be treated under these specifications.

Preparation of Poles—All surfaces which are to be treated should be carefully cleaned of all adhering inner bark. Parts of the exterior surface showing signs of decay, soft or brashy wood, should be shaved off until sound wood is exposed. This is especially important when poles which are to be reset are being treated.

Treatment—Barrett's Carbosota—*Grade-One Liquid Creosote Oil* should be heated to about 150° F. and two coats applied to that section of the pole extending from one or two feet above, to two or three feet below, the future ground-line. The second coat should not be applied until the preceding application is thoroughly dry. The preservative should be used liberally and especial care taken that all checks and crevices are well saturated.

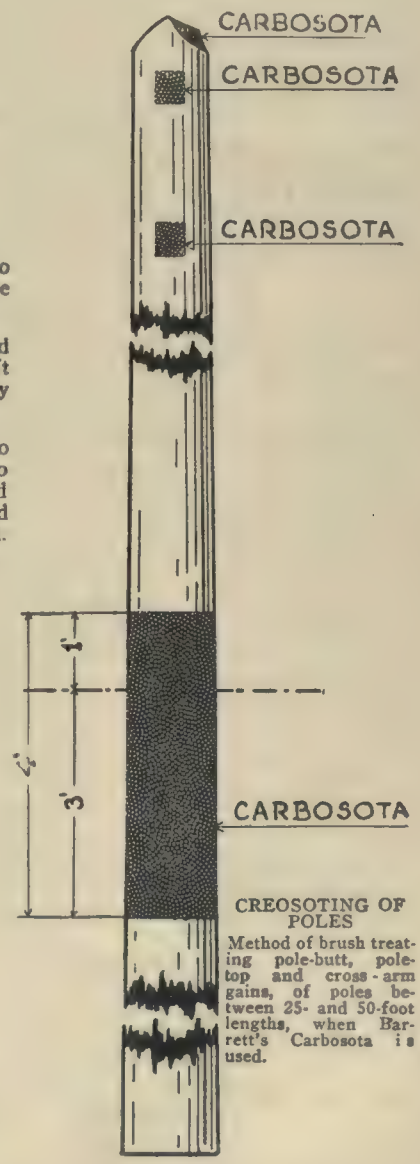
Tops and gains of poles should likewise receive two coats of the preservative.

Handling Treated Poles—Care should be taken that brush-treated poles are not handled in a manner which will destroy the film of preservative. If the treated section is injured, an additional coat of preservative should be applied previously to setting. That is also advisable if poles have been stored in yard for some time after treatment.

(Preservative treatment of fir cross-arms is also necessary if the full benefit is to be derived from creosoting poles).

Barrett's Carbosota is a pure coal-tar creosote oil especially refined for this method of treatment. It is liquid, permanent, toxic and economical.

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And don't you think that the carbon brush buyer who is wined and dined to bouth by the cheap brush seller wakes up with the dark brown color on his tongue instead of on his commutators?

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Printing begins on Tuesday of each week.
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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at Progressive Pittsburgh

The Pittsburgh Railways Company purchased about 1,000 tons of Titanium-treated rail in 1915 and about 3,000 tons in 1916. The rail used is Association Standard "B," 7-in. and 9-in. girder.

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Titanium-treated rail is the choice of the largest and best-managed electric railways in the United States.

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It is the finest and latest car for service along famous Lake Chautauqua.

It weighs about 45 tons completely equipped, or fifty tons in all, allowing for seventy-two seated passengers.

It will be operated between Jamestown and Westfield, a distance of thirty-three miles with three intermediate stops, in fifty-nine minutes.

It will use far less energy than a like car with plain bearings and will never have a hot box because it will have

Gurney Radio-Thrust Ball Bearings

GURNEY BALL BEARING CO.

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STEEL INTERURBAN CARS

An interurban car represents the railway corporation in the same large and distinctive sense that an ocean liner represents its company. The city car is too common a sight and not big enough to be very effective and the steam car is subordinated by the locomotive; but the interurban, whether run singly or in trains, is the one impressive, distinguishing object which, to a large extent, expresses the character of the company. And as in a massive creation such as this, good appearance and good construction are one and the same thing, it is obviously of high importance to have the combined experience of the engineers and highly trained steel-car designers of the four Brill plants focussed on a splendidly harmonious and completely representative result, the production of cars which will look and be safe and powerful and have an individuality to their style and comfort.

So much for the work of the engineering and drafting departments.

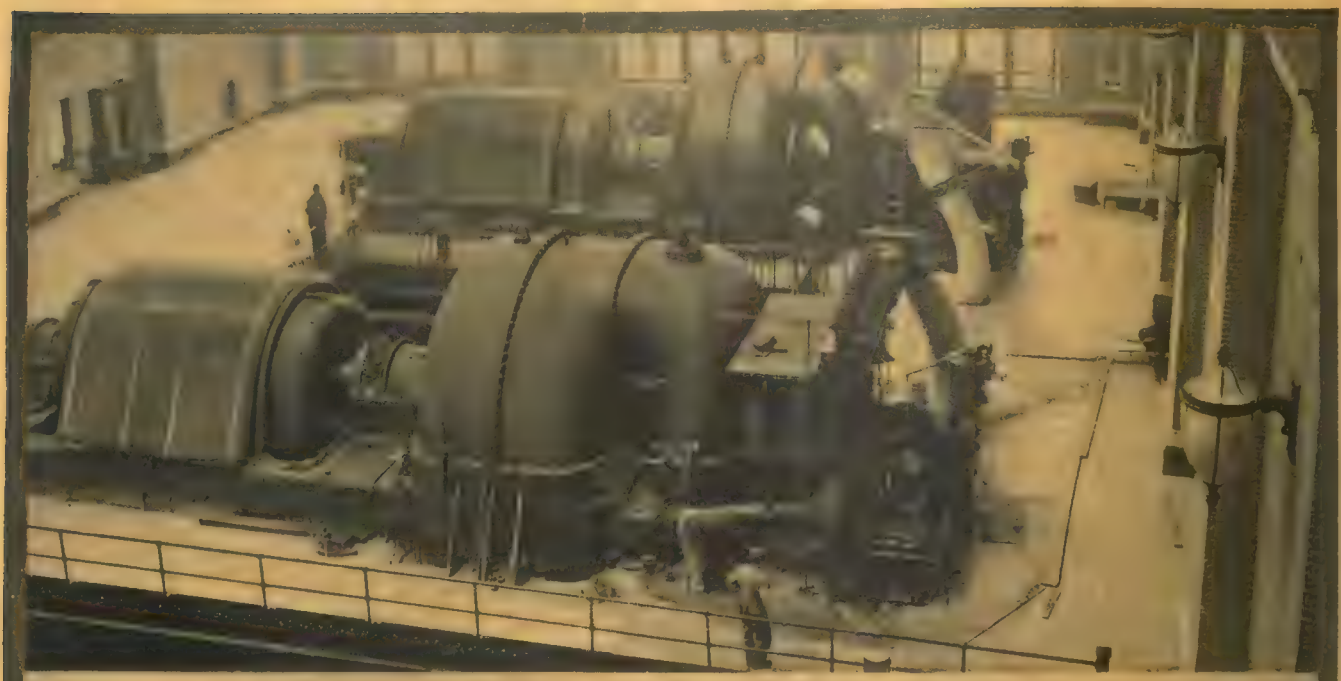
The works must have the organization and facilities to carry out the plans exactly as laid down in their minutest detail; otherwise both the planning and production departments will be hampered and, unless they fully know each other's limitations, will work at cross purposes.

The Brill organizations are not only unlimited in their facilities but, with the exception of the electrical equipment, are able to manufacture both carbodies and trucks complete with all their furnishings and accessories.



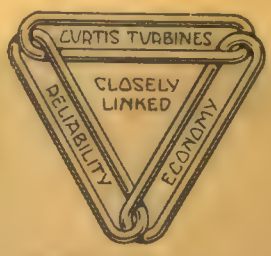
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